

A TEN YEAR PLAN FOR THE ECONOMIC AND SOCIAL DEVELOPMENT OF THE BELGIAN TRUST TERRITORY OF RUANDA-URUNDI



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MR. ANDRÉ DEQUAE, *Minister of Colonies*

P R E F A C E

The Ministry of Colonies presents today "The Ten-Year Plan for the economic and social development of Ruanda-Urundi." It may be of interest to explain the particular significance of this publication.

After the first world war, Belgium accepted to hold the Mandate for these territories which formed part of German East Africa. These regions were poor, entirely lacking in equipment and yet overpopulated. Our country undertook the task of developing them and raising the population as a whole to a level of civilization comparable to our own.

In 1943, the Belgian Government voluntarily accepted to replace the Mandate by the Trusteeship regime, instituted by the United Nations Organization. This agreement was approved by Parliament. We were in this way confirming our commitment to ensure the precedence of the natives' interests and to promote their progress.

The Ten-Year Plan is the solemn and detailed expression of this intent.

It is not an abstract utopia, nor a purely economic scheme. Based on the respect of man, it was elaborated primarily for the men and women of Ruanda-Urundi, it announces deep and substantial improvements in their conditions of life. Agriculture and livestock breeding will be perfected, industries will be created, hospitals, schools and a university will be organized. It answers spiritual and intellectual needs as well as material requirements.

For the inhabitants of Ruanda-Urundi, the Ten-Year Plan is a promise made to them by Belgium; it is also the guarantee of a better future. This is what it really means.

The Plan was conceived in a very comprehensive way. Before considering future prospects, it gives a detailed account of the present situation. Therefore, it represents a general survey of the current economic and social problems in Ruanda-Urundi and constitutes an exceptionally valuable work of reference.

It was drawn up by the Administration of these territories under the impulse and supervision of Vice-Governor General PÉTILLON. It was then examined and discussed in Brussels at conferences presided by the Minister of Colonies.

All those who have contributed to this work are entitled to our congratulations and our gratitude, but special mention is due to the local civil servants and agents who have furnished the greater part of the effort.

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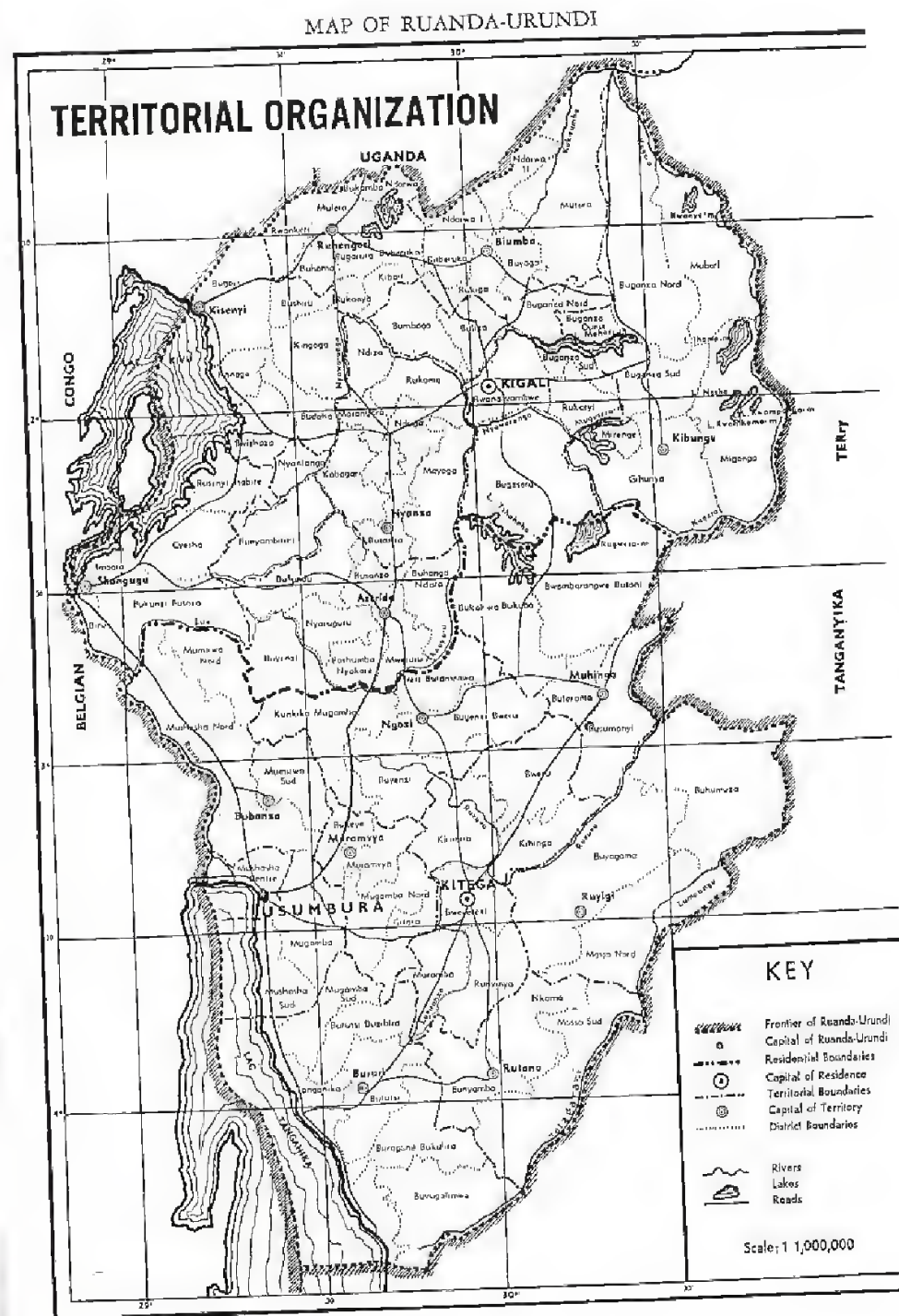
It is not enough to draw up a plan of expansion, it must also be implemented. We shall certainly meet with difficulties, for we intend to accomplish important transformations. The ob-

stacles we shall have to conquer will sometimes be technical, and sometimes they will be of psychological nature.

That is why we must have the assistance of the scientists and technicians, but also the collaboration of the civil servants and the support of the populations of Ruanda-Urundi. In this effort in favor of their welfare, we expect them to co-operate with us.

Whatever their goodwill, their knowledge and their courage, men are sometimes disappointed in their expectations by the course of events; may Providence assist us in this great task we have undertaken.

André DEQUAE,
Minister of Colonies.



INTRODUCTION

After the Belgian Congo Plan, we now have the "Ten-Year Plan for the economic and social development of Ruanda-Urundi."

The introduction of the latter shall be shorter: what was expressed with such power and clarity, a year and half ago, by Mr. WIGNY, then Minister of Colonies, need not be repeated here. For, in a longer introduction, we could but re-state the same principles, expound identical considerations. In particular, we should have to recall that a Plan means foresight and even long-term foresight; and we cannot foresee everything. We should also have to say that this Plan was drawn up in a given time, that allowance has been made for all known factors and, to a reasonable extent, to the present evolution of the juncture; if circumstances follow a different evolution, the implementation of the Plan will have to be modified. We should also have to confirm what was already true of the Congo Plan: that this is not a compulsory set of instructions. Each year, after having approved it as a whole and corrected it as may be judged advisable, Parliament will vote the necessary credits for its progressive application and so control its realization and decide upon the adjustments which the Government might propose according to circumstances.

Belgium's policy is the same in Ruanda-Urundi as in the Congo. In both territories, it is guided by the same fundamental precept, the precedence of the natives' interest; the same thought is also shared by those who bear responsibilities at various levels and on different planes; similar methods, inspired by common ideals, rule their action.

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Like the Congo Plan, this Ten-Year Plan is a work of good faith, submitted to the study and criticism of all who care to take interest in it. No doubt, it is incomplete and imperfect. But it would also be true to say that everything has been done, in the given time, to avoid mistakes and prevent omissions. Those which will nevertheless be discovered, were probably inevitable; for this is not the work of one man, nor of a group, but the collective work of all who in some capacity were normally expected or able to participate in it.

As early as April 1950, the structure and details of this Plan were discussed at the Council of the Vice-Governor General at Usumbura; many personalities, representing all the interests concerned, were invited to hear it. The Council studied it in Committees and in full meetings, and unanimously approved the Plan, "with conviction and enthusiasm."

Later, as the drafting was pursued, they consulted, either in particu-

lar or in groups, experts from all quarters: natives and non-natives, officials and private persons, laymen and churchmen, Belgians and foreigners. Criticism was welcomed and any requested co-operation was given gladly. Extensive lectures made the Plan known in the country, to audiences composed mainly of natives, and great care was taken to ensure that they fully understood its scope and significance. As soon as the local work was concluded, it was sent to Leopoldville, where it was studied in the offices of the General Government in order to give the Governor General an opportunity to add his observations. Finally, it was submitted to the Minister of Colonies who, with some officials of his department, amended it before giving his approval.

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Though in various respects it may appear similar to the Belgian Congo Plan, the Ruanda-Urundi Ten-Year Plan had to be distinct from the former. The legal status of the two territories is different; their budgets are separate; above all, their problems are deeply dissimilar.

Hence, the same policy, the same methods, when applied to these two neighboring regions of Africa, by the same nation with strong and clear traditions, must be expressed by differently structured programs.

The populations, their density, their distribution, their way of life; the soils, their composition, their value, their natural destinations; the resources, their scope and nature; the various breeds of cattle and their political, social and economic significance; the customs, their origin, their rules and their objectives; the political structure and its social and judicial consequences—all these elements, which are infinitely complex and intricate, are fundamentally different in the Congo from in Ruanda-Urundi.

That is why appropriate, often opposite, solutions must be given to the problems in the two countries.

This work is intended to explain the problems of Ruanda-Urundi as well as the technical answers suggested to solve them.

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But in Ruanda-Urundi, more than elsewhere perhaps, technical solutions will remain a dead letter if we do not first of all consider the sole vital problem, that of the native and his habits of behavior. Nothing can be achieved without first solving this question.

What would be the use of realizing the drafted programs, at the cost of a great deal of money and toil, if the populations of the Territory remained aloof and uninterested? What would be the outcome of the huge and co-ordinated labor of all those whose business it is to plan, command or carry out orders? We must be convinced that without the

natives, without their active co-operation, everything would be impossible from the very start, and that nothing would be worth while attempting.

Ruanda-Urundi might be called an African Tibet. A high country on the banks of the great African lakes, it long remained cut off from the world. And today still, remarkably unchanged and extremely uniform in its various aspects, it is a country which contrasts with the surrounding regions.

A strange country indeed.

A land of glamorous hills, the pastures of smooth-haired cattle with great lyre-shaped horns; a land of shepherds and agriculturists, of dancers and minstrels, governed by aristocrats who are also shrewd politicians. From them originated that ideal of life which, centuries ago, spread and took root everywhere: to be a "shebujá", a lord, living in the happy contemplation of his herds and the mental tasks of his "abagaragus"; or to be an "umugaragu", a client, in the service of a "shebujá" whom one flatters to receive favors which will enable one to become the lord of other humbler "abagaragus" in quest of serfdom and thus constitute one's own court.

This ideal of life can be understood, but today the majority of the natives themselves consider it as obsolete. Moreover, no way of life is immutable or permanent, except perhaps among strictly isolated tribes, who live off the land and respect its laws. Now Ruanda-Urundi, which was long inaccessible, is becoming increasingly integrated in the world circuit; above all, Ruanda-Urundi has long ceased to respect the laws of the land. For the herds, the forest was cut down and the arable area was gradually reduced, while the number of men and women to be fed was growing all the time. The cow became the center of what amounted to a cult. The cattle fattened on pastures which were continually being extended, while men forgetful of the laws of nature, required more and more unreasonable yields from a dwindling soil. And the soil revolted. Exhausted, it refused to go on feeding these ever more numerous men and cattle; and then came the years of famine.

This state of things should have been remedied centuries ago. But everything was centered on the cow: the political system, the social structure, men's ambitions and their destiny. In isolation—not only of the country as a whole—but in their individual isolation, the inhabitants lived in their "ingos". Without contact with each other, unbelievably apathetic, incredibly improvident, imprisoned in their narrow beliefs, without any horizons, or needs, or desires, they were obsessed by a single notion: the "cow-complex" which determined the rank of each one. "After the Mwami, nothing is superior to the cow" said native wisdom.

This is what must be abolished. Already, by the contact with the new civilization brought by the men from the outside world, other interests were born in the minds of the new elite, but the ancient ob-

session remains powerful and the masses continue to live according to the customs of old.

It is with the already willing cooperation of the Bamis, the Chieftains and the men of influence that this fundamental reform must be pursued, by means of an intense and untiring effort of education and persuasion. For it will not be enough to fulfil the various material tasks, it will also be necessary to reach the native's soul, his mind and his heart, to correct his temperament and transform his life. And there, beside and above the technical solutions suggested by the Plan, is the vital human solution to which all of us must devote our most diligent care. And from this angle, before being a Plan for economic development, this program, which is concerned above all with the condition of man, has an essentially social character.

But there is more. In this Trusteeship Territory, the economic and social questions are not the only ones which are inter-related: by the cow, the soil and the feudal customs, the political issues are also involved in nearly all the projected solutions.

The political structure will also have to be reformed in this new order we are endeavoring to introduce.

The United Nations Organization is primarily concerned with the political evolution of the Territory. This is perfectly natural, as the object of the Trusteeship is to prepare the peoples for self-government. However, before achieving their autonomy, they will have to build their economy on solid and permanent foundations; they will have to adapt their social structure to the principles of democracy; through learning and education, they will have to acquire sufficient political maturity.

What more efficient method is there to accomplish all this, than to associate the natives more and more closely with the great work that is being initiated, than to give the Bamis, the Chieftains and the masses themselves a part of the responsibility of its realization?

This is to be the object of the political reform, the study of which is now almost concluded, and which will democratize the Administration of the country by the creation of partly elected Councils.

This reform is the indispensable complement of this Ten-Year Plan: it will make it possible to solve the problems connected with the economic and social development; it will satisfy the wishes of the Trusteeship Council; and it will provide Belgium with a new instrument to achieve the great task she has assumed in undertaking to make of this naturally poor Territory one of the happy lands of the world.

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MWAMI CHARLES MUTARA RUDAHIGWA, KING OF RUANDA.

I.

THE POPULATION AND ITS NEEDS

A. THE NATIVE POPULATION AND ITS NEEDS

1. THE NATIVE POPULATION

As concerns the general evolution of the native populations, their density and distribution, their birth-rate and death-rate, and the prospective importance of the custom-ruled locations and the "centres extra-contumiers," (I) the demographic characteristics of Ruanda-Urundi are very different from those of the Belgian Congo.

The native population of Ruanda-Urundi totalled 3,882,392 inhabitants on December 31, 1949. The population of the Belgian Congo, which is 43 times the area of Ruanda-Urundi, is scarcely 3 times more numerous. (11)

On the basis of a conservative interpretation of available demographic statistics, the population of Ruanda-Urundi appears capable of increasing by 100,000 inhabitants annually in normal circumstances, that is, by some 3%, and this tendency may be expected to develop still further as a result of improvement in the conditions of life. At this rate, the population would be doubled in less than 40 years.

Up to date, emigration to "centres extra-contumiers" has been insignificant: less than 2% of the population. This is a consequence of the more backward mentality of this country's people and of the slower economic expansion of the Trusteeship Territory, while in the Belgian Congo it grew to such proportions that the "centres extra-contumiers" now account for about 20% of the total population.

The demographic density, which varies considerably in the different regions, is expressed by an average of 184.00 inhabitants per sq. mile. This is the highest figure in Central Africa, while the figure for the Belgian Congo is only 12.28.

This exceptional density of the population in Ruanda-Urundi and its numerical increase constitute the most alarming demographic problem of the country, where the land is overworked and of an insufficient yield, owing to degradation of the soils, unfavorable weather conditions and lack of water.

Emigration to the Belgian Congo, which began in 1947, has to a limited extent remedied the oversaturation of the Territory. Up to date, it has conduced to the displacement of 24,000 inhabitants. According to

- (I) Self-governing native groups within a white community.
- (II) Area of Ruanda-Urundi is 20,994 sq. m.
Area of the Congo is 908,469 sq. m.

the estimates considered by the Ten-Year Plan, the emigration of 100,000 more will be organized in the course of the next ten years.

The most urgent aspect of this problem relates to the food supply and it may be said that it wholly dominates the economic and social evolution of the country.

Provided we offset the danger of famines, which used periodically to decimate the country, this abnormally dense population in the heart of the black continent might become one of the essential factors of Ruanda-Urundi's development, by reason of the potential productivity and consumption it represents.

After the example of Belgium, a small and thickly populated territory incapable of feeding its population, Ruanda-Urundi, occupying a central position in Africa, would specialize in the export and processing of the raw materials from the vast neighboring territories where labor is short. It might build its wealth on the work of its population, incorporated in manufactured goods destined for export. These exports would supply the necessary resources to acquire the indispensable complement of imported food, as well as the goods required for its development and welfare.

The population of Ruanda-Urundi also differs from the Belgian Congo by another typical feature, due to a social organization restricted to the family group: this is its extreme dispersion, from hillock to hillock, illustrated by the complete absence of villages.

This dispersion constitutes the most important and insidious obstacle to any civilizing action. As long as the populations remain scattered as they are to-day, they will continue to live in the shadow of this apathy in front of which any attempt to improve their fate is bound to fail.

The only solution resides in tactful and persistent pressures directed towards progressive regrouping. Such action should succeed in creating agglomerations in which the basic ferments of progress—example, initiative and competition—would be given an opportunity to develop.

The Ten-Year Plan considers a program of progressive regrouping over a number of ten-year periods. This program will be initiated by a small number of pilot-experiments, which will be multiplied later, in order to provide the country with a series of villages which are expected, by virtue of example and with the help of large-scale publicity campaigns, to spread and eventually cover the whole Territory.

2. LABOR

On December 31, 1949, there were 101,340 workers in Ruanda-Urundi, representing 13% of the total number of able-bodied adult men.

This figure includes 71,016 full-time workers—of whom over one-third are employed in industry—and 38,324 part-time workers, i.e. re-

spectively 65% and 35% of the total. This proportion—a sign of the present degree of labor stability—is the result of patient and untiring efforts which the Administration proposes to continue and intensify.

Labor employed in Ruanda-Urundi.

The essential problem relating to labor is insufficient output, and this reflects a situation that applies to the whole active population. This state of things—which can be observed in various degrees in all African territories—is due to many causes, of which the principal are obstacles raised by custom, deficiencies in food and sanitation, lack of professional education and insufficient technical qualifications. These factors are described at length in the Ten-Year Plan.

Under the impulse of the Administration and private enterprise, the traditional native mentality, characterized by the habit of communal work, is being gradually reformed; this can only be a long-term policy and a rapid evolution cannot be expected.

The weak constitution of the worker, which is due both to an inadequate diet and to his unsatisfactory state of health, is one of the main factors of his low output. These factors will be progressively offset by the measures—detailed further on—considered by the Ten-Year Plan in the field of food and medical care.

Progress in the field of professional training will be stimulated by the realization of the Ten-Year Education program, characterized in particular by a more practical orientation of elementary education and by the extension of professional education.

The lack of qualifications is an obstacle to output which may be gradually removed by the creation of "Qualification Juries." The task of these juries is to hold examinations for workers of the various crafts and give a formal appreciation of their professional skill, which will make it possible to establish wage-scales based on the results of these examinations.

The fact that this institution, owing to lack of co-operation on the part of the employers, has not yet attained any great measure of success in Ruanda-Urundi, seems to indicate that contrary to former expectations, no organic solution will be found without resorting to legal measures.

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Concerning labor wages, if from the economic point of view the present level is justified considering the poor quality of the majority of workers, from the social point of view, it cannot be held to be satisfactory. The Government's policy is to tend by gradual stages towards a minimum standard and then go beyond that, when the various measures applied to improve the quality of labor have produced results. Already to-day, the minimum wage-rate is established each year by a decree on the basis of a table of minimum requirements drawn up in accordance with the proposals of the "Committee for Labor and Social Progress."

Among other measures included in the Ten-Year Plan with reference to labor, let us quote the improvement of the workers' housing conditions—of which more is said further on—and the creation of a Service of Inspection of Labor Conditions.

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Mechanization, another important aspect of the problem of the output of labor, could find many applications in Ruanda-Urundi, in the sectors where it would contribute to lowering the cost of production or increasing productivity.

Progress in this field will be achieved mainly by private initiative, though the State must nevertheless fulfil a double function:

- (a) to encourage and promote initiative by realizations such as vocational guidance, extension of vocational training, etc.
- (b) to carry out the progressive mechanization of those of its services that are suitable for it, such as road-building yards, etc.

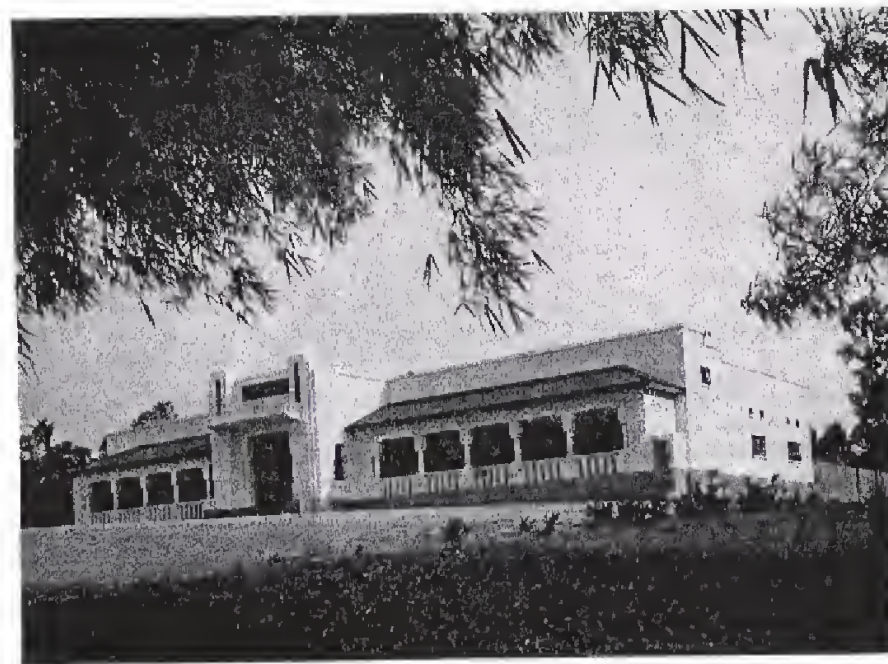
Emigration of labor.

Apart from the labor employed inside the country (which we have just analyzed), about 15,000 natives of Ruanda-Urundi work in the Belgian Congo, while from 30 to 40,000 workers emigrate for some months each year to the bordering British territories.

The emigration of labor to the Belgian Congo is due, on the one hand, to the recruiting effected by the mining and agricultural companies of the Congo, and on the other hand, to the movement of labor that finds employment for some months of the year in the regions around the Kivu lake. Out of a total of 14,371 laborers employed in the Belgian Congo on December 31, 1949, 5,929 were working in the mining industries, whose contemplated recruitment from Ruanda-Urundi amounts to about 1,000 to 1,500 workers per annum for the next ten years.

As for the seasonal emigration of labor to the territories of Eastern Uganda and Tanganyika, it began during the German occupation and has increased since by reason of the development of these regions, but its drawbacks greatly outweigh its advantages. It is true that it ensures a relatively important inflow of currency, but on the other side, it involves the absence of a large number of women and children during many months of the year. Furthermore, in spite of the precautions taken by the Public Authorities, it constitutes a sanitary danger, and in practice it takes place in the majority of cases without any control.

It appears likely that this migratory movement will tend to decrease and cease altogether as the economy of Ruanda-Urundi expands.



THE RESIDENCE OF THE MWAMI OF RUANDA AT NYANZA. For the local chief's convenience this residence was built in 1932.

3. FOOD

As far back as it goes, the natives' oral tradition reports that Ruanda-Urundi never ceased to be a prey to periodical famine and dearth.

The food supply is a difficult problem in this steep country, where the soil is generally eroded and poor, the climate unreliable and where furthermore, the regions favorable to agriculture are overpopulated.

The diet of the native population—which varies according to race and social rank—presents the following general characteristics:

1. An abundance of glucides derived principally from sweet potatoes; a large quantity of vegetable proteins, provided mostly by beans and peas.
2. An almost total absence of vegetable fats and, for the majority of natives, of animal fats; an insignificant supply of animal proteins:
 - the altitude does not permit the growth of the oil-palm, and the other oil-seeds are practically unknown in the country.
 - meat is very scarce and too expensive, and represents only a scant contribution.
 - fish is still consumed only by a small percentage of the population.
3. Important quantities of green vegetables are occasionally consumed.
4. A taste for milk, though only the Batutsi consume it regularly.
5. An important consumption of fermented liquors.

According to the estimation drawn up in the Ten-Year Plan on the basis of the current figures of the population's needs in food and availabilities in foodstuffs, meat, milk and fish, the balance shows a shortage of at least 11,300 Tons⁽¹⁾ of animal proteins and 44,200 Tons of fats, and a surplus of at least 98,100 tons of vegetable proteins and 625,400 tons of glucides.

The essential problem for the coming years is to check the degradation of the soil, which is overworked and is growing constantly poorer. To achieve this, it will be necessary—as expounded in the Ten-Year Plan—to effect a selective reduction of the cattle, to relieve the overpopulated zones by causing the transfer of a part of their present inhabitants to less populated areas, to specialize the agricultural production of the various natural regions, to persuade the natives to alter their way of life and to promote a valorization of products by the creation of local industries.

One of the aims of the agricultural expansion program is to develop cultivation in certain regions destined to become main sources of supply.

Moreover, the qualitative improvement of nutrition will be pursued by the multiplication of the sources of supply in fats—in particular by intensifying the culture of groundnuts, soya, oil-palms, as well as by the

(1) All indications of weight are calculated in metric Tons. (1 metric Ton = 0.984 avoirdupois Ton).

extraction of cotton-oil—and in animal proteins, by a better organization of native stock raising, together with a rational use of livestock products and the expansion of fishing and pisciculture.

These general provisions will be completed by a certain number of measures intended to correct the nutritional deficiencies of "priority groups": pregnant women, young mothers, babies, school-children and workers.

The implementation of the program outlined above allows us to expect within ten years—in spite of the increase in population, which may be estimated at 25%—a progressive improvement of the food balance.

Furthermore, in order to assess the value of this improvement, we ought to be able to take into account the following important factors, which form part of the prospective realizations of the Ten-Year Plan, but whose results will only become gradually appreciable:

- scientific research and experiments with a view to increasing productivity.
- the valorization of certain regions, among which the Ruzizi plain is as yet the only one for which certain results can be evaluated.
- the emigration of a part of the excess population to neighboring non-saturated regions.
- a progressive increase of the native income, which will make it possible to purchase increasing quantities of imported foods.
- the production of synthetic proteins extracted from vegetable by-products and residues.

4. THE WATER SUPPLY

On water depend the fundamental problems that determine the development of the African continent. It would be vain to attempt to solve them without first satisfactorily solving the hydrographic questions.

This observation is particularly true of Ruanda-Urundi, where the data of this vital problem are: irregular rains, a general tendency to drought which has already led to the disappearance of all permanent water reserves in certain regions, intense and destructive erosion.

Our knowledge of the water cycle and hydrographic peculiarities is still too incomplete and fragmentary to enable us to give a systematic solution to the problem of water in this country. That is why the study of these facts is—together with the prospective realizations regarding water supply—an integral part of the Ten-Year program in this field, which may be summarized as follows:

— Knowledge of ecology in all its aspects and of the water cycle and all its factors, in order to increase seepage.

— The study of hydrology in order to make use of existing veins and secure their preservation and strengthening.

— The supply of drinking water to centers, with a view to reducing the time required to fetch water, to improving its purity and ensuring requisite hygiene:

— Provisions for the supply of water are made according to the system best adapted to each location: by piping water by means of gravity systems or pumping-plants.

— The program envisions 203 simple water catchments and 53 catchments involving special methods of piping.

— Improvement of the conditions of water drawing in custom-ruled districts:

— The dispersion of the population implies that water must be drawn at the catchment points; where circumstances permit, small pipings might be considered to bring the water nearer to the homes.

— The program provides for the improvement of 19,257 fountains and 1,728 wells or catchments:

— in the regions with abundant resources, small fountains will be installed on the springs.

— in the regions with limited resources, where natural springs do not suffice, wells will be sunk and equipped with pumps, or deep drillings will be bored.

— in the regions with scant resources, the fountains equipping existing sources will be coupled with wells or deep drillings.

— The supply of water to particularly dry regions, in order to allow human re-occupation and improve conditions of cattle watering.

— *First stage*: a general survey of these regions and experiments on erosion control, the restoration of veins, the use of wind-motors and potential irrigation.

— *Second stage*: practical implementation on the basis of the previous studies and experiments:

— densely populated regions (Bugoye and Mulera): the first practical measures might consist in digging of drains and irrigation trenches.

— sparsely populated regions (Mutara, Bugesera, Mosso, Lower Ruzizi): water might be supplied by wells equipped with hand- or force-pumps, irrigation, reservoirs or the restoration of veins.

— Draining of swampland, with a view to strengthening the veins and at the same time increasing arable areas.

— Increase of arable areas by means of irrigation.

— Organized and generalized fight against drought:

— In order to offset it, each catchment must be protected by little trenches intended to prevent trickling and feed the veins.

— In the regions deprived of water or with scant resources, it will be necessary to dig supply trenches over each catchment.

5. CLOTHING

For the native of Ruanda-Urundi, clothes are a means of protection against the weather and the cold rather than an ornament.

Progress in clothing, an important factor of hygiene in this country, is clearly shown by the increased consumption of textile products: in the course of 15 years, the consumption of cotton textiles has increased nearly 4 times, of bed-rugs 5 times, and so has the consumption of clothes and ready-made articles of clothing; over the last ten years, the average increase has been as from 1 to 3.

According to the detailed assessment reproduced in the Ten-Year Plan, the current consumption of the native population of Ruanda-Urundi totals about 14 million yards of textiles of all types, which corresponds to an average of about 3.3 yards per head, as against over 7.5 yards in the Congo, which is explained mainly by the fact that, contrary to the custom in Ruanda-Urundi, textiles frequently form part of the dowry in the Congo, and that moreover, the native of Ruanda-Urundi makes greater use of rugs than the native of the Congo, as in many districts he uses them both for the night and in day-time on account of the cold. That is why Ruanda-Urundi consumes over a million rugs, i.e. one per 3 or 4 inhabitants, to be compared with 1 per 7 inhabitants in the Congo.

It would appear reasonable to estimate that, as in the Belgian Congo, the consumption of textiles will probably reach an average of 16 yards per head in ten years' time, but, if we consider the fact that rugs will continue to be frequently used as a piece of clothing, it would be wiser to expect only a three-fold increase in the consumption of textiles, that is, a total of approximately 39 million yards. As for rugs, the consumption may be expected to attain a total of 2 million units in ten years' time, which is twice the present figure.

6. HOUSING AND THE ARRANGEMENT OF URBAN CENTERS

The housing problem is different according to whether we refer to the custom-ruled locations—where, with few exceptions, the majority of



WEIGHING IN. At the tin mining village of Rwinkwavu, young mothers present their babies for a periodical check up.

the population still live in the antique straw-huts—or to the "centres extra-coutumiers," where we observe an increasing concentration of populations composed mainly of workers.

The magnitude of the task—which includes the solution of the problems of the supply of water, firewood, timber and various building materials, as well as, in the centers, of the problems of power, light, public thoroughfares, evacuation of garbage, etc.—the considerable needs and the very limited resources had hitherto made it impossible to draw up a general scheme of work and had always imposed provisional solutions.

The program of systematic action envisaged by the Ten-Year Plan as the opening phase of a long-term policy, can be summarized as follows:

Housing in the custom-ruled locations.

To build and organize real villages composed of houses complying with the requirements of hygiene is an essential task, the answer to a vital need.

In 1948, the Government started to build salubrious houses in the interior of the country, which were made available to the natives against long-term payments, but except in a few districts, this experiment aroused no enthusiasm among the population.

In the future, the program of construction of salubrious houses will be drafted according to the suggestions of the territorial administrations on the basis of local circumstances and the necessity of progressively promoting the creation of native agglomerations. As far as possible, construction will be mechanized and standardized.

Housing in the "centres extra-coutumiers".

The main "centre extra-coutumier" is Usumbura, with approximately 15,000 inhabitants. The other "centres extra-coutumiers" and cities are far less populated, but all of them, with the exception of Rumonge on lake Nyanza, are situated next to a non-native city which determines their importance and development.

The detailed study of town-planning in these centers and cities will be entrusted to the local authorities or, in the case of Usumbura, to an "Office des Centres Extra-Coutumiers."

The area of the individual plots will vary according to the date of origin of these centers, the improvement of public services and achievements in the field of hygiene.

The distribution of drinking and household water, already realized at Usumbura, will be arranged in the extensions of the capital and in the other centers and cities.

Medical, sanitary and social services are projected to complete those that already exist; the same goes for the schools and churches.



A GOOD PLACE TO BE SICK. A corner of the hospital of Kabgayi in Ruanda. 200 beds, 2 operating rooms, 2 maternity wards. 600 births a year.

The task of the "Office des Centres Extra-Coutumiers" is to build, acquire, arrange and plan homes and other buildings for the resident population. This bureau will be in charge of the planning of the various centers and will establish an annual program of work.

The workers' villages will follow, with the necessary adjustments, the measures adopted for the "centres extra-coutumiers".

Native Administrative Centers.

It has become urgent to create in each chieftaincy a center to provide the inhabitants with advantages that the community cannot offer in its traditional way of life. This instrument of administration is of considerable significance in a country where the population is so extremely scattered. Further, the creation of such centers is destined to bring an essential contribution to the progressive elevation of the custom-ruled community, by initiating and perfecting its political education, and at the same time furthering its economic evolution.

The program projected by the Ten-Year Plan tends to set up an administrative center in each chieftaincy. In the course of the next ten years, the buildings lacking in the various centers will be constructed for this purpose, provided that those that already stand are not situated outside a limited dispersion-area. The implementation of this program is based on an order of priority founded on the demographic factor and on the degree of usefulness of the requisite buildings.

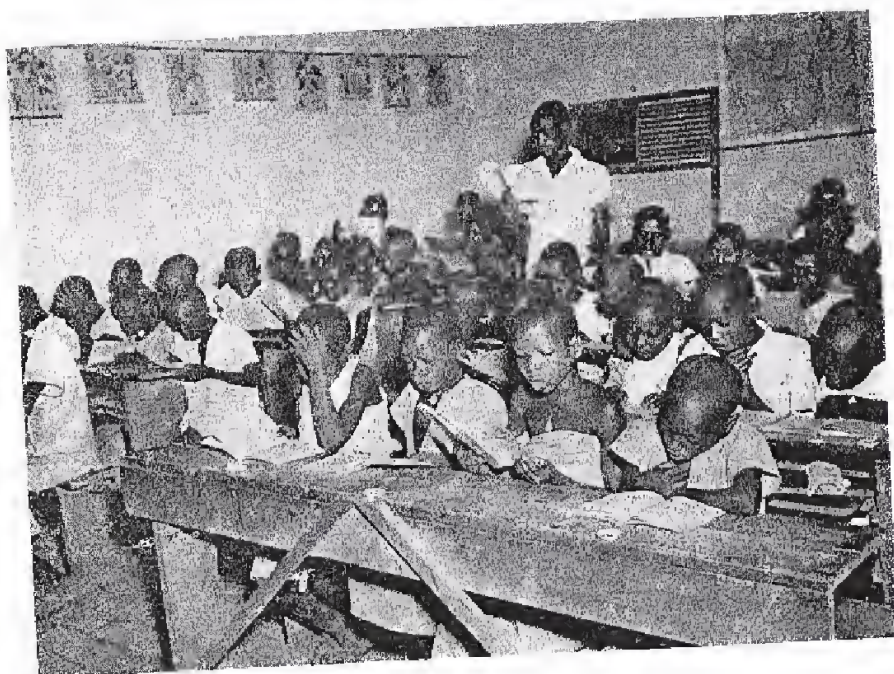
7. HYGIENE

In Ruanda-Urundi the medical problem, which is closely connected with the question of native nutrition, dominates human productivity and, on a broader plane, the elevation of the native population's standard of life.

The principal diseases which medical and prophylactic action is endeavoring to control in this country are, as listed in the Ten-Year Plan: sleeping sickness, malaria, exanthematous typhus, smallpox, cerebro-spinal meningitis, typhoid, diseases of the alimentary canal, amoebic dysentery and helminthiasis, recurrent fever, consumption, leprosy, diseases of the respiratory organs, venereal diseases, eye complaints, benign and rodent ulcers.

The medical protection of the mother and child consists in the organization of prenatal and nursing advisory services and the preventive quinization of babies.

Considerable work has already been accomplished. As shown by the experience acquired in the course of some thirty years, it will be necessary to intensify sanitary and prophylactic action in all sectors and at



ONLY 26 LETTERS IN THE ALPHABET, BUT . . . Young students at work in the Catholic Mission school of Kabgayi in Ruanda. There are 1200 students in this establishment.

the same time progressively remedy a serious insufficiency: the shortage of auxiliary native personnel in the State medical services.

The prospective achievements of the Ten-Year health program can be summed up as follows:

The equipment, extension and multiplication of sanitary organizations, which means:

- to provide the four main centers with a hospital for natives and a hospital for Europeans and Asians.
- to equip two rural hospitals in each territory, which involves the building of 17 new ones, thus raising the total number to 37 within ten years.
- to increase the number of rural dispensaries so that, as each of them serves a district with a radius not exceeding 6 miles, immediate medical care may be made available to the whole native population. This scheme will involve the construction of 98 new dispensaries, raising the total figure to 182.

Better protection for the mother and child, that is:

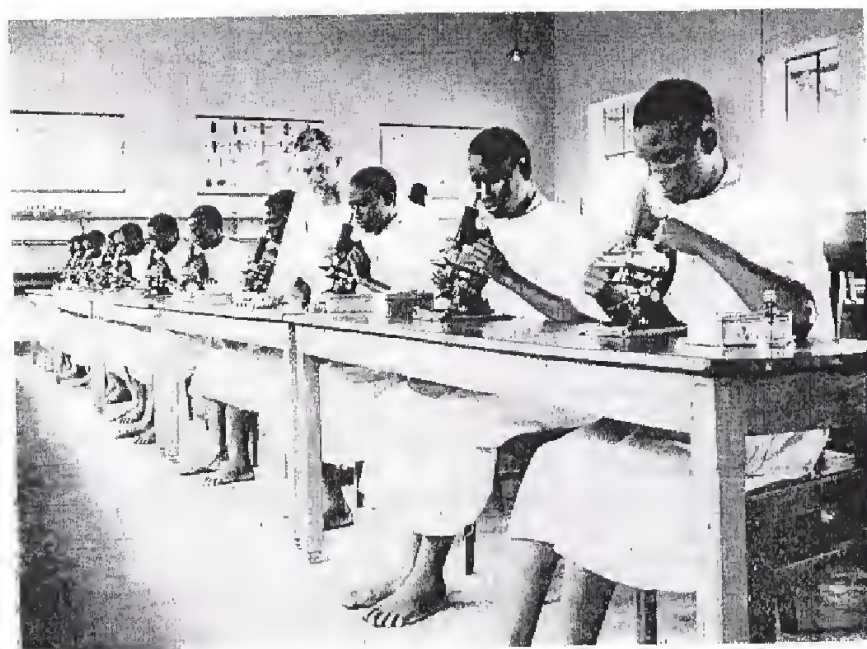
- to adapt the existing maternity wards to answer new requirements.
- to set up maternity wards in the new institutions.
- to increase the number of nursing advisory services, the total figure to be raised from 44 to 72.
- to organize prenatal consultations in all hospitals and dispensaries where European personnel is available.
- to institute pediatric centers in the native cities.

The construction of two sanatoria for T.B. patients, of one mental hospital; the creation of two agricultural villages for lepers; the improvement of the present lazaret-houses.

Further action for improved sanitary conditions throughout the country, by organizing large-scale campaigns to promote parasite-control, quininization and ascertainment of tuberculosis:

- the parasite-control campaign will require 4 teams of 20 nurses' aides and 110 workers.
- the quininization campaign will mainly concern preventive quininization of infants, aiming at a yearly average of 35 grs. per child.
- ascertainment of the sleeping sickness will be intensified by the adjunction of 2 teams to the present 7.

An ambulance is to be put at the disposal of each hospital with a view to ensuring the speedy transfer of serious cases from the dispensaries; the acquisition of 30 ambulances is considered for this purpose.



NATURE'S SECRETS DIVULGED. At Astrida (in Ruanda) the Brothers of Charity have organized in cooperation with the government of Ruanda-Urundi a primary school, a high school and special schools for medical assistants, veterinarians and future chiefs.

The construction of a new medical laboratory at Astrida and a laboratory of hygiene at Usumbura.

The construction of a drug warehouse at Usumbura.

* * *

The implementation of this program in the next ten years will require considerable increases in the European and native staff and in the medical services, as can be seen by the following figures:

- the European personnel will be increased from 78 to 138 units.
- out of this total, the number of doctors will be increased from 39 to 82, and the number of medical assistants and sanitary agents from 42 to 54.
- the native staff will be increased in the following proportions: there will be 108 medical assistants instead of the present 26, 430 hospital attendants instead of 39, 642 nurses' aides instead of 214 and 93 obstetric assistants instead of 18.

Recruitment of this native personnel will be made possible by the following training institutions:

- medical assistants: the medical section of the Astrida School Group (active now).
- hospital attendants: 4 schools (to be set up within ten years) at Usumbura, Kigali, Kitega and Ruhengeri.
- nurses' aides: 4 schools at Usumbura, Kigali, Kitega and Kabgayi (active now).
- obstetric assistants: 4 schools, of which 2 are active now (at Kabgayi and Ibuye) and 2 to be created (at Usumbura and Astrida).

8. EDUCATION

From the social angle, education must contribute to the progressive accession of the natives to a philosophy of life which they would be incapable of attaining by their own means. The economic preoccupations which inspire it are consistent with the social ideal, as they tend to provide knowledge of professional techniques, not only with a view to increasing the number of trained auxiliaries equipped with the European "know-how" but also in order to stimulate native economy by the introduction of various skills and crafts.

The following program, which is a brief summary of the detailed exposition given in the Ten-Year Plan, was drawn up in accordance with these considerations:

- in terms of quantity, the extent of the effort in each branch of education was adapted to meet current economic and social requirements, in so far as they could be "measured."
- the most urgent necessity resulting from the present situation is to remedy the serious numerical and qualitative insufficiency of the native teaching staff at all levels.
- parallel to each study course with a definite purpose, education is provided for the less well endowed and for those who are unable to finish the course or to carry on their studies to the normal further level; this organization works concurrently with a scheme of adequate selection and vocational guidance.

Education for Boys.

The effort accomplished in the past tended to reach the bulk of the native population, by providing elementary education, and to form the nucleus of a native intellectual elite.

In the future, the main thought shall be to gradually constitute a middle class, with an elite of skilled craftsmen.

Prospective achievements are:

GENERAL EDUCATION FOR THE MASSES:

- First degree Elementary Schools: 128 new classes, bringing the total from 2,334 to 2,462 classes.
- Ordinary second degree Elementary Schools (for pupils who do not attain selection level): 110 new classes, bringing the total from 549 to 659 classes.

SPECIALIZED EDUCATION FOR THE MASSES:

- Pedagogic Training Centers (destined to train supplementary teachers for the first degree Elementary classes): 5 new P.T.C., bringing the total from 5 to 10 and providing for the training of 2,400 teachers in ten years.
- Schools for auxiliaries (training of native district assistants and minor commercial agents): 2 residential schools, as well as training centers organized at territorial level.
- Courses for adults: about 40, to be organized among the circles of "advanced" natives, the schools for auxiliaries and the workers' camps.

SELECTIVE EDUCATION:

- Second degree Elementary Education (Selection classes: preparing for access to the various categories of selective and Secondary education): 102 new classes, bringing the total from 24 to 126.

- Training for teachers: 4 new schools, bringing the total from 2 to 6 and providing for the training of 800 teachers in ten years.
- Grammar schools (training for the office professions): 2 schools which will train about 150 qualified clerks in ten years.
- Technical Secondary schools: in addition to that of the Astrida School Group, a second school is to be established at Kitega, which will provide for the training of some 600 students in the course of the next ten years.
- Latin Grammar School: one in Ruanda (at a later date, another one in Urundi).

PROFESSIONAL EDUCATION: See p. 34.

UNIVERSITY LEVEL EDUCATION: Its possibilities are being actively studied.

Education for Girls.

The program chiefly tends to gradually raise the education of girls to the same level as the boys' education, as it is now considerably lower, both in numbers and scope of subjects. This backwardness is mainly due to the traditional lack of feminine emancipation.

Prospective achievements are:

GENERAL EDUCATION FOR THE MASSES:

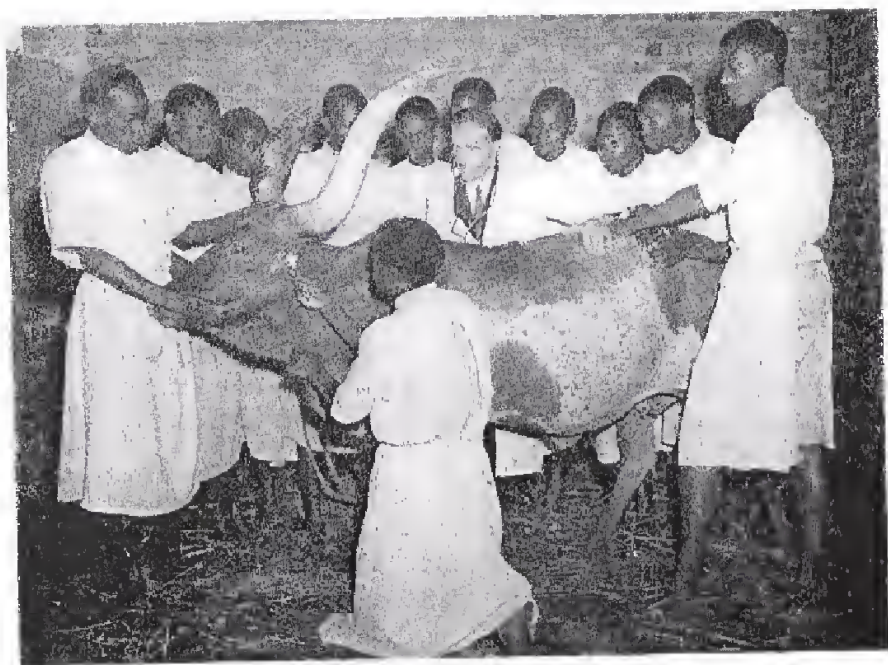
- Day-nurseries (for both sexes): they will be generalized in the administrative and commercial centers, and in the vicinity of missions.
- First degree Elementary schools: 80 new classes, bringing the total from 148 to 228.
- Second degree Elementary Schools: 120 new classes, bringing the total from 160 to 280.

SPECIALIZED EDUCATION FOR THE MASSES:

- Elementary domestic economy schools: 14 new pre-Elementary schools, raising the total from 1 to 15, as well as 6 post-Elementary institutions.
- Pedagogic Training Centers: 6, providing for the training of over 400 supplementary teachers.

GENERAL SELECTIVE EDUCATION:

- Secondary domestic economy schools: 2 new schools, raising the total from 1 to 3.



THE SICK COW AND THE YOUNG VETS. *A practical lesson at the Astrida school in Ruanda.*

- Schools for teachers: 2 new schools, raising the total from 2 to 4 and providing for the training of about 650 teachers.

Professional Education.

Contrary to general education, professional education can only be conceived as a means of satisfying certain economic requirements which, in the native communities of Ruanda-Urundi, still prove to be extremely limited.

The following program is a relatively modest start, for it would be foolish to advocate more important achievements before the expansion of native economy is really initiated.

Prospective realizations are:

- A professional school at Usumbura, including apprenticeship sections and 3 professional sections: woodcraft, iron and building.
- A professional school at Kigali, including apprenticeship sections: woodcraft, iron, mines and works.
- A professional section for woodcraft at Kitega.
- 21 apprenticeship workshops organized by the missions.
- 4 residential road-building yards, training road-surveyors and foremen.
- Territorial workshops, according to local requirements.
- A vocational guidance service at Usumbura.

9. SOCIAL AND CULTURAL ACTION

Social and cultural action in its various forms—the press, radio, cinema, study groups, libraries, sports, social welfare work, enterprise boards, workers' committees, labor commissions, etc.—prolongs and completes the action for the improvement of the factors of native welfare: food and water supply, hygiene, education, etc.

For after having worked out a vast plan of action for his benefit, our task is to touch the native's soul in his daily life and surroundings and to persuade him to accept the ways of thought and conduct on which material and spiritual progress is founded.

As a consequence of the very restricted means mobilized, the results obtained up to date have been limited.

The Ten-Year Plan details the program designed to broaden and intensify this action in the course of the next ten years. This scheme may be outlined as follows:



YOUNG MEDICAL ASSISTANTS. *At the Astrida school the students prepare for the medical profession.*

The Press.

The circulation of local papers in the native language will be supplemented by the dissemination of tracts and pamphlets intended either for the masses or for the more educated part of the population.

The Radio.

A public address station, equipped with a receiving and transmitting set for the diffusion of local programs or retransmission by loud-speakers placed in the chosen centers, will be instituted at Astrida, Kigali and Kitega, in addition to the one now functioning at Usumbura.

The Cinema.

To the existing equipment, about 10 permanent installations with projectors and 2 mobile groups more particularly intended for the custom-ruled populations, will be added 3 new permanent stations and a third mobile group.

The Theater.

The theater being one of the most direct and suitable modes of expression to reach the soul of the people in this country, it is intended to create a theatrical section composed of two mobile groups which will tour Ruanda and Urundi respectively. Subject-matter will be centered on the various social and cultural themes.

Sports.

Considering the natives' increasing keenness on sports—especially soccer—the existing fields will be enlarged or equipped with lasting materials, and new ones will be constructed; the total figure is to be raised to 147 within ten years.

Libraries.

Four libraries for the more educated natives exist today; efforts will be made to render them more popular, and further libraries will be established in the territories that do not possess any yet. Further, literary prizes will be awarded each year by the Government to the winners of competitions organized with a view to the production of literary works in the native language.

Clubs for "Advanced" Natives.

In addition to the 7 present clubs (of which 3 belong to the Government and 4 are due to private initiative), others will be instituted by

the State, in view of the anticipated increase in the number of educated natives.

Social Welfare.

The object of Social Welfare is to educate and aid the natives in their material, moral and social life. Its principal means of action consists in promoting the native women's education as wives and mothers.

In Ruanda-Urundi, its action was limited until now to 2 "centres extra-coutumiers": Usumbura and Astrida.

Social Welfare action is to be extended to all "centres extra-coutumiers" of the Territory: Kigali, Nyanza, Kitega and Ngozi.

As the good work which can be accomplished in this way is nevertheless insignificant, considering the extremely low proportion of the women of the "centres extra-coutumiers" by comparison with the total feminine population, the creation of rural branches of the main Welfare centers is contemplated. They will serve as Social Welfare training schools for students who intend to become branch leaders.

Homes for the Old and Orphanages.

Two homes for the old will be built at Kigali and Kitega, as well as two homes for orphans—in the same centers—in the course of the next ten years.

Other Social Organizations.

The action of these various organizations—committees for Labor and native social progress, native enterprise boards, local workers' committees and native professional trade unions—will be developed and their efficiency will be gradually increased in the course of the next ten years.

B. THE NON-NATIVE POPULATION AND COLONIAL SETTLEMENT

1. THE NON-NATIVE POPULATION.

On December 31, 1949, the distribution of the non-native population was the following:

| | |
|--|-----------------|
| European population | 3,407 or 51.44% |
| of the total non-native population. | |
| Non-European population | 1,711 or 25.82% |
| Mixed blood (mulattoes and half-breeds) | 1,506 or 22.74% |
| Total | 6,624 |

The following lines are a summary of the Ten-Year Plan's comments on this population and its evolution:

(a) *The European Population.*

Since Belgium took over the administration of Ruanda-Urundi, Belgians represent about one-third of the non-native population and two-thirds of the European population. Among the other Europeans, the most numerous fraction is formed by the Greeks (25.14%), followed by the British (11.63%), the French (10.15%), the U.S. Americans (8.67%) and the Italians (8.28%).

A sure sign of the stabilization of the non-native population is given by the increasing percentage of women and children who, at the end of 1949, accounted for 55.41% of the whole.

The distribution according to profession is as follows: Government agents 17.99%, company agents 32.22%, missionaries 28.40%, private individuals, settlers and traders 21.36%. In the course of the past ten years, the "company agents" and "private individuals, settlers and traders" groups have considerably increased, as a result of the commercial and industrial expansion which characterized this period.

(b) *The non-European Population.*

This population includes mainly Indians (54.35% of the total number of non-Europeans) and Arabs (19.45%), to which must be added a few score other Asians (2.10%) and Africans coming from non-bordering territories, as well as the half-breeds (40.97%) of Asian descent, whose increasing numbers show that this population mixes with the native population much more easily than the Europeans.

While the increase of the Arab population has hitherto been relatively slow, the Indian group is rapidly augmenting.

By comparison with the whole, the "women and children" group represents 67%, a sign of certain stability, while the number of children (48.12% of the group) is a token of great vitality.

This population is mostly engaged in trade. It includes a few craftsmen.

* * *

The estimations of the Ten-Year Plan concerning the probable evolution of the various groups of which the non-native population is composed, are listed as:

| | |
|---|-------|
| Government Agents | 1,000 |
| Missionaries | 800 |
| Private Individuals, Settlers and Traders | 1,000 |

| | |
|--------------------------|-------|
| Company Agents | 1,500 |
| Without Profession | 3,000 |
| Non-Europeans | 3,500 |
| Mulattoes | 500 |
| Asian half-breeds | 2,000 |

That is, in ten years' time, a non-native population of approximately 13,000 inhabitants.

2. COLONIAL SETTLEMENT

According to the census of February 28, 1949, there were 399 settlers in Ruanda-Urundi (1 settler per 9,676 natives, to be compared with 1 settler per 2,363 natives in the Congo), distributed as follows: 139 traders (34.5%), 109 industrial settlers (27.4%), 67 agricultural settlers (16.9%), 57 craftsmen (14.4%) and 27 settlers practicing one of the liberal professions.

As explained in the Ten-Year Plan, the future possibilities of colonial settlement are very different from those obtaining in the Belgian Congo: while, by reason of the human and cattle surplus, the prospects for agricultural and stock raising settlement are extremely limited, a vast field of expansion awaits colonial settlement in the domain of industry, craftsmanship and commerce. As for forestry, it is mentioned only as a reminder, as one of the country's main features is an almost total absence of forests.

Agricultural and Stock Raising Settlement.

In spite of its limited possibilities, this type of settlement is warranted in Ruanda-Urundi, in particular by reason of its potential educative value.

In order to determine these possibilities, it would be advisable—according to the Ten-Year Plan—to draw up a map dividing each territory into: (i) the regions where no new concessions can be allowed, (ii) the sparsely populated regions, or those regions which, though populated, still contain enough vacant land to allow a few concessions to be granted, and (iii) the regions exclusively suitable for forestry.

In the populated regions, the concessions which might be granted would in no case exceed 120 acres and they would be subordinated to intensive cultivation of the land. In the less populated districts, the concessions might attain 500 acres, provided certain farming conditions are respected. As for the areas destined for re-timbering, they could be conceded without any acreage limit.

As concerns livestock farming, it would be desirable to grant only those concessions which, in the great pastoral regions, would serve to institute pilot-farms, of which 2—with a maximum surface of 500 acres

—should be installed in each region. Furthermore, pork and poultry production appear profitable, as well as medium farms, in the vicinity of Usumbura and Shangugu, producing milk for the European population.

Industrial and Mining Settlement.

Industrial settlement will greatly benefit in the coming years by the economic expansion oriented towards industrialization.

Whether industrial manufacture is a main or subsidiary activity for the settler, it will offer prospects of increasing returns, both in the field of production proper and in the field of public equipment.

Concerning relations between colonial settlers and the native co-operatives, the best system to ensure a fair distribution of profits and the best possible use of capacities, would be to set up an association between the native cooperatives for production and the industrial colonists for manufacture.

As for mining settlement, which is comparatively much more important in Ruanda-Urundi than in the Congo, it will be possible to increase its modest possibilities in some degree, thanks to the discoveries that may be expected from the proposed research and prospecting.

Commercial Settlement.

The re-grouping of populations, industrialization, the improvement of the territory's economic equipment, the gradual increase of the native income are factors which will materially further the activity and field of action of commercial settlement. Commercial colonists will find it advisable to work in closer co-operation with native trade.

The commercial organization will be strengthened by the multiplication of trade centers, whose number will increase from 31 to 73 by the end of 1952. As he cannot personally settle in these centers, the non-native trader, instead of continuing to be represented by a native commercial agent or "capita," would find it advantageous to train the latter in the practice of fair and honest dealing and send him back as a free trader, whom he would keep supplied in trading wares and from whom he would purchase products of native origin.



MWAMI MWAMBUTSA, SULTAN OF URUNDI.

II.

THE DEVELOPMENT OF THE PUBLIC SERVICES

A. TRANSPORTATION

INTRODUCTION

The mountainous configuration of Ruanda-Urundi makes it very difficult to plot the layout of highways and railroads and to construct them.

Remote from the sea, Ruanda-Urundi is not a land of transit; on the contrary, it is situated at the terminus of the great communication lines. Geographically, its natural ports are Mombasa and Dar es-Salaam, although allowance must be made for the fact that for the whole of Belgian Africa Leopoldville is both the center of distribution of imported goods and the focal point where export goods converge.

On the other hand, inhabited by an exceptionally dense and scattered population, this mountain country depends for its economic expansion on an extensive network of communication lines, the realization of which is facilitated by the considerable amount of available man-power.

At present, there are already 4,830 miles of carriage roads, which corresponds to an average of 0.222 miles of road per square mile. The road program detailed in the Ten Year Plan tends rather to the improvement of existing roads than to the building of new ones.

Now before we consider the problem of transportation in Ruanda-Urundi, a preliminary question must be answered: how should exports and imports be oriented? To the East or to the West?

From the geographical point of view, the Territory belongs to the hinterland of the Indian Ocean ports, the eastern highways being the shortest natural routes, involving the fewest reloadings and, in general, the cheapest.

The comparison drawn in the Ten-Year Plan between the Usumbura-Dar es-Salaam and the Usumbura-Matadi route (supposing the construction of the new Usumbura-Stanleyville road to be already completed, as well as the straightening of the Usumbura-Costermansville Road) gives us the following result, on the basis of the actual transport costs in both cases: the unit cost of the Ton per mile is 2,173.5 francs (1) by the Usumbura-Dar es-Salaam line, and from 2,939 francs to 3,567 francs by the Usumbura-Costermansville-Stanleyville-Matadi route.

At first view, the unit cost of the Ton per mile is clearly in favor

(1) 1 dollar=50 Belgian francs.

of the eastern direction. However, the survey of the Ten-Year Plan adds that the following complementary facts must be taken into consideration:

- the essentially variable nature of maritime freight; moreover, maritime traffic between Europe and Dar es-Salaam must bear the tax levied at the Suez Canal, amounting to an average surplus cost of 300 to 400 francs per Ton.
- the probable reduction of the difference between transportation by the East and West routes, on account of the higher cost which will result from the re-equipment and increased exploitation costs of the Kigoma-Dar es-Salaam railway.
- the balance between the upstream and downstream transport.
- a factor lowering freight costs—which will tend to take place as exports by the western routes gradually increase.

In view of these considerations, the opinion expressed in the Ten-Year Plan is that it would be safe to conclude that, without resorting to any protectionist tariff policy, certain of the western routes will be able to compete with the eastern lines.

1. TRANSPORT BY ROAD

With its 4,840 miles of roads, Ruanda-Urundi has the densest system of central Africa.

Unfortunately, none of these roads present the characteristics of the modern highways; some of them were built too hastily; others are nothing but improved caravan tracks, straightened out in some places. The constructive works are insufficient: the maximum load is 5 T. per axle on the main roads, 3 T. on the secondary roads and 1.6 T. on the passenger roads. With the exception of a few reinforced concrete bridges, these works do not offer the characteristics required for heavy traffic.

The specifications adopted by the Ten-Year Plan, both for the arterial highways and the feeder lines, are:

- maximum grade: 7%, exceptionally 8%.
- minimum radius of curves: 132 feet.
- roadbed width: 27 feet in the straight lines, with an additional width in the curves.
- carpet width: 20 feet in the straight lines, with an additional width in the curves.

The nature and thickness of the carpet will vary according to the exigencies of local terrain and traffic.

The new road system projected by the Ten-Year Plan is based on the following general scheme:

After the construction of the Stanleyville-Costermansville arterial route, with its branch line to Goma, a new highway which will materially

improve communications with Matadi, the four most important routes connecting Ruanda-Urundi with the overseas lands will be:

- Shangugu (Costermansville)-Stanleyville-Matadi.
- Kisenyi (Goma)-Stanleyville-Matadi.
- Usumbura-Kigoma-Dar es-Salaam.
- Kakitumba-Mombasa via Masaka-Bukagata-Kisumu or via Kagera Port or via Kampala.

Ruanda-Urundi will in this way possess four principal exits: Shangugu, Kisenyi, Usumbura and Kakitumba.

These four points will be the origin of interior arterial roads which will converge to connect the whole network and thus allow the hinterland limits of the four exits to be altered at will.

Furthermore, the Usumbura-Shangugu arterial road will play an outstanding economic role, in particular by serving for local transport and by directly connecting Usumbura with the Costermansville-Stanleyville-Leopoldville highway.

Let us now outline the achievements projected by the Ten-Year road program in accordance with the general plan defined above:

Arterial Highways.

HIGHWAY A: Usumbura-Astrida-Nyanza-Kigali-Kakitumba.

This is the present backbone route of the country; it will be relatively easy to improve it and adapt it as a main highway.

Three alternates—from Usumbura at milestone 17, from milestone 43 to milestone 50 and from Butare to Kigali—will usefully shorten the lay-out, and reduce the cost of carpeting and future maintenance as well as transportation distances.

The various sections of this highway will mainly serve: to the South, to drain products towards Usumbura; in the centre, to act as a feeder-line for highway C; to the North, to connect eastern Ruanda with Mombasa via Kakitumba.

HIGHWAY B: Kisenyi (Goma)-Ruhengeri-Kigali.

Considering the construction of the Stanleyville-Costermansville arterial route in the Belgian Congo, it was decided that a branch of this route should start from Walikale to establish a direct connection with Goma. The Ruanda-Urundi B highway will constitute the prolongation of this branch to the center of Ruanda, to Kigali, where it will rejoin highway A.

HIGHWAY C: Shangugu (Costermansville)-Astrida, with a branch to Nyanza.

This is a direct prolongation of the Stanleyville-Costermansville

arterial route. It will utilize the lay-out and roadbed of the Shangugu-Astrida route, now under construction. A branch to Nyanza will also be planned and constructed.

USUMBURA-COSTERMANSVILLE HIGHWAY:

The lay-out by the Ruzizi plain is undeniably the most economical in all respects. The present Usumbura-Kalundu-Uvira-Costermansville line is 102 miles long, while the Usumbura-Costermansville connection through the plain will be 91 miles long.

Feeder-lines:

- Kibungu-Kayanza, with a branch to Rwinkwavu: feeder-line of highway A towards Kakitumba, and of Highway B via the Kayanza-Kigali section of highway A.
- Muhinga-Ngozi-Kayanza: feeder-line of Highway A towards Usumbura.
- Ruyigi-Kitega-Muramvya-Mwizinga: feeder-line of Highway A towards Usumbura.
- Mosso-lake Nyanza: feeder-line enhancing the value of the Mosso district.

* * *

The above program covers 881 miles of modern roads, of which 562 miles are existing roads which will be improved and 319 miles, proposed roads to be constructed.

This work for the improvement of the road system with a view to intense traffic by heavy trucks carrying up to 15 T. of net cargo, will cost about one million francs, according to the detailed evaluation reproduced in the Ten-Year Plan. But on the other hand, this modernization of road equipment will lower the cost of transportation per T./mile, increase the economic area of exports and imports and contribute to raising the standard of life of the natives, who will get a higher price for their products and purchase trading wares at a lower rate.

2. WATER-BORNE TRANSPORT

Ruanda-Urundi has no natural or potential navigable rivers.

As for the Tanganika and Kivu lakes, which form two-thirds of the total length of the western frontier, although they represent only a short link of Ruanda-Urundi's outward transportation routes, their port



ROAD BUILDING. In the plains of the Ruzizi a bulldozer prepares the road that will make new regions accessible.

installations are vital points in the Territory's network of communication lines.

The port of Usumbura is the only one destined to attain major importance as the country's principal outlet. The other lake ports, Nyanza lake and Rumonge on the Tanganika lake, Kibuye and Kisenyi on the Kivu lake—will be equipped in view of a much smaller volume of traffic.

The prospective achievements detailed in the Ten-Year Plan are summed up in the following lines:

Port of Usumbura.

The activity of this port, whose traffic in 1949 reached 24,261 Tons for export and 52,300 Tons for import—almost three times the 1939 commercial tonnage—is unanimously expected to increase considerably in the future, by reason of the expansion of its hinterland and the industrialization of the country. Traffic may be expected to double within ten years.

At present, its installations include a simple ferro-concrete pier, 3,384 square yards of warehouses and a working area of 31,200 square yards; two ships may be moored and made fast to the sides of the pier.

This equipment is already insufficient today. Improvements are in progress and extensions are considered: aggrandizement of the pier to allow a more rapid circulation of trains between the quays and the storehouses, which will also be increased. These partial ameliorations are already in hand and will permit a 30% increase in traffic within the next two years.

Moreover, the construction of an inner harbor is contemplated to provide for future requirements. A draft project is already established and the first phase of this work—to be completed in the course of 1951-1952—will suffice to allow an estimated traffic of 330,000 T. a year. The proposed storehouses will have an area of 27,600 square yards, of which 8,640 square yards are to be built up during the first phase, which also includes the setting up of 6 cranes.

Port of Rumonge.

This port has only an insignificant traffic, in particular on account of its total lack of equipment.

Considering the anticipated increase, in the course of the next ten years, of the agricultural production of the Bururi and Rutana territories, which is partly exported through Rumonge, the port traffic could reach 10 to 15,000 T. In order to handle this traffic, a 100 foot concrete pier and a 180 square yard storehouse are projected. In addition, the CFL is also contemplating a 120 square yard warehouse and a caterpillar crane.

Port of Nyanza lake.

The future valorization of the Mosso district will bring increased traffic to this port which now caters for the southern parts of the Bururi and Rutana territories. In anticipation of 10 to 15,000 T. of traffic, the following installations are proposed for 1951-52: a 100 foot pier, a 360 square yard customs storehouse, the CFL undertaking to install a 240 square yard warehouse and a caterpillar crane.

Port of Kisenyi.

Situated in a well sheltered bay whose shores offer great facilities for the creation of port installations, Kisenyi port is destined to expand and absorb the traffic of the small port of Goma. The production of the hinterland will increase to some 30,000 T. in the next ten years, but we must consider the fact that apart from the Mombasa road, the Sake-Masisi road, which rejoins the highway from Costermansville to Stanleyville, will drain the exports towards Matadi.

Envisioned equipment for Kisenyi in 1951-52 includes: A 130 foot quay wall, a 900 square yard warehouse and an electric crane.

Port of Kibenge.

This small well sheltered port has no permanent installations and still handles only a meager traffic, which is destined to increase to approximately 5,000 T. in the future.

In 1951-1952 the port will be fitted with a 65 foot wharf, a 300 square yard warehouse and a caterpillar crane.

3. AIR ROUTES

Usumbura is connected today with Brussels, Johannesburg, Entebbe and Nairobi, Cairo, Athens, Loanda and via Leopoldville with the United States.

A Usumbura-Kigoma connection is envisaged in the near future; the Usumbura-Dar es-Salaam liaison is soon to be re-instituted. Usumbura is thus becoming a more and more frequented port of call on the great trans-African airlines.

The ten-year program, briefly outlined here, envisions the planning and equipment of 4 airports for regular lines, on the basis of the classification adopted by the International Civil Aviation Organization (I.C.A.O.): Usumbura (C 2 Class), Kigali (G 6 Class), Astrida (G 6 Class) and Kirega (G 6 Class).

Usumbura Airport.

As Usumbura has to meet the exigencies of a constantly increasing traffic, the construction of a new airfield has been undertaken; it is now

approaching completion. Its specifications are: width 330 feet, with a gravel landing-strip 2,180 yards long and 170 feet wide. To satisfy C Class requirements, the width of the field will have to be increased to 500 feet, the length of the runway to 2,600 yards and its width to 200 feet. Further, this airport will be equipped with the necessary buildings and services: administrative and auxiliary services, hangars, workshops, gasoline tanks, day and night ground-lights, meteorological and radio coverage, etc.

Kigali Airport.

At present, this airfield only has a gravel runway 1,360 yards long and 100 feet wide. Its adaptation as a G 6 class airfield will necessitate transformations and in particular the lengthening of the landing-strip, to be increased to 1,553 yards. These alterations will be carried out in 1952.

Astrida Airport.

It is impossible to lengthen the present aerodrome at Astrida, which is 870 yards long and throttles the expansion of the city. A new G 6 class airfield 1,635 yards long will be constructed in the neighborhood in 1953.

Kitega Airport.

The construction of a small G 6 class aerodrome of local interest at Kitega is being studied. Proposed date is 1954.

* * *

Other than in the 4 centers mentioned, the question of local interest airfields need not be considered during the next ten years, as Ruanda-Urundi has a very well developed road system network. Besides, the territorial capitals and the important posts are very close together and the rugged surface of the country makes it very difficult to find fields of sufficient length and access for modern planes.

The interior mail service is ensured either by weekly postal trucks or by foot-couriers; the latter will be replaced in 1951 by a fleet of side-cars.

As for the desirability for using helicopters for interior mail distribution, or even for transportation of merchandise or people, it is rightly not considered in the program for the next ten years, on account of the hazards which this relatively new form of aviation still presents in high-altitude regions.

B. THE PUBLIC SERVICES

1. TOWN-PLANNING

Town-planning may be defined as a method for rationalizing the human occupation of a territory in compliance with the principles of aesthetics, public hygiene and economics.

In their present stage of evolution, the tropical countries are giving birth to human concentrations which organize themselves and develop at a more or less accelerated rate.

In this respect, Ruanda-Urundi, a country hitherto without villages, which is now being equipped and industrialized, is witnessing the creation of cities whose expansion may be extremely rapid. Haphazard crowding in confined and unorganized areas is an obstacle to social evolution. Therefore, the creation and extension of these cities must be controlled.

This matter is ruled in the Belgian Congo by the Decree of February 21, 1949, not yet applicable to Ruanda-Urundi. The peculiar conditions of the Trusteeship Territory will doubtless lead to the promulgation of a separate decree for this region.

The urban centers of Ruanda-Urundi are yet new-born cities, but we must anticipate their speedy growth.

Up to date, four of them—Usumbura, Astrida, Kisenyi and Shangugu—have been subjected to investigations on town-planning, in order to collect the requisite elements for the drafting of a survey previous to the drawing up of general plans of arrangement. We will now give a brief outline of the prospects considered in this regard by the Ten-Year Plan.

Usumbura, the administrative capital and the principal port of Ruanda-Urundi, and also its main commercial and industrial town, has grown at a tremendous rate. Its position on lake Tanganika as a cross-roads of overland and water-borne communications and a relay station for the airlines, and the importance of its hinterland constitute securities for a brilliant future. To be ready for it, the organic arrangement of the city must be delineated by a very simple zoning: the labor quarters to the North, with the industrial and port installations to the Northwest; to the East, the residential quarters, extending southwards; in the center, the commercial and administrative districts.

Astrida, apart from its economic function as a compulsory gateway, seems destined to become a scientific city. The residential extension of the city is possible to the Northeast, while the labor quarters develop to the East. If the establishment of the scientific institutions is provided for to the South and Southeast, the Northwest would be reserved for the industrial plants.

Situated in one of the most beautiful sites of Central Africa, Kisenyi presents a definitely residential and touristic aspect. Moreover, as the harbor activity of Goma cannot expand any further, the activity of Kisenyi port will be increased. Town-planning problems are urgent in this center: demarcation of residential districts, extension of labor quarters, delineation of industrial zones and their access to the port, etc.

As for Shangugu, a suburb of Costermansville, its planning must necessarily be subordinated to that of the neighboring city. Its development will be influenced by a series of factors, such as the suppression of the Kalundu-Kamaniola railroad, the Usumbura-Shangugu highway, the Astrida-Shangugu-Costermansville arterial connection which will turn Ruanda into its natural hinterland and give it an unquestionable economic and residential importance.

Concurrently with the work relative to these four centers, other localities of Ruanda-Urundi will also have to be studied without delay, with regard to the salient features and specific needs of each one.

2. STORAGE AND PRESERVATION OF PRODUCTS

In Ruanda-Urundi, owing to the scarcity of arable land, the density of the population and the distance between consumption centers, the program of agricultural food production tends only to cover the needs of local consumption and accumulate sufficient stocks of foodstuffs to provide against famines. Export of foodstuffs is only a secondary aim and only concerns the possible surplus due to a good harvest and the stockpiled foodstuffs when they are replaced by fresh products.

It was in view of these considerations that the Ten-Year Plan tackled the problems of the equipment and management of storing and preservation installations. Conclusions can be summarized as follows:

(a) SILOS.

Provisions include:

In the interior regions:

- 6 hangars or surface silos, built on the initiative of the Native Welfare Fund and destined to store foods which will be purchased to provide against shortages in production. Their total surface is 2,160 square yards and they will provide for the loose stockpiling of 1,500 T. of foodstuffs. This capacity may be doubled in emergency cases.
- seed granaries, collective small-capacity granaries to be built in native locations.



MAIN STREET OF USUMBURA. The constant increase of tourist traffic provoked the construction of the two hotels shown in this photograph.

At Usumbura:

- a battery of 6 vertical silos, with a capacity of 6,000 Tons, permitting the stockpiling of;
- a permanent reserve of 4,000 T. of foodstuffs, in addition to those of the interior.
- approximately 2,000 T. from the stocking hangars of the interior.

Certain silo elements may also serve for the stocking by private companies of products allocated for local industry or export.

(b) WAREHOUSES.

The program includes:

- the aggrandizement of the customs warehouse at Usumbura in 1951. In view of the anticipated increase of the port's volume traffic, the subsequent construction of 2 warehouses of 4,000 square yards each is envisaged.
- the construction of a 240 square yard storehouse at the Ruhengeri and Kagitumba customs stations of a 360 square yard storehouse at the Nyanza lake customs station and of a 180 square yard storehouse at Rumonge.

On the other hand, the transportation companies' plans are:

- the CFL:—to aggrandize the existing storehouses and build new storehouses at Usumbura; to erect a new storehouse at Nyanza lake and Rumonge.
- Ottaco:—to erect warehouses at Kibuye and Kisenyi.

(c) FREEZING INSTALLATIONS.

The program envisions the construction of a 480 square yard cold store at Usumbura, destined to preserve:

- the cattle slaughtered for local and regional native consumption: approximately 600 head per month.
- choice meat imported from Marungu and destined for Ruanda-Urundi and Kivu: approximately 100 head per month.
- a reserve stock of butter, cheese, etc.: approximately 20 T. per month.
- fish: approximately 10 T. per month.

The installations will include a pre-refrigerator (2° C), a refrigerator (—2° C) and a congealing room (—15° C).



MODERN AND BETTER HOUSING. *A modern village originated by a banking and a railroad concern at Usumbura.*

Moreover, the Otraco and the CFL are considering the possibility of fitting certain of their ships with cold rooms.

(d) TANKING AND DISTRIBUTION OF FUEL.

The current fuel consumption of Ruanda-Urundi and the eastern Congo amounts to 71,000 two-hundred liter drums a year, the Trusteeship Territory accounting for 36,000 drums. According to the Ten-Year Plan, requirements may be expected to double within ten years, rising to about 15,000,000 liters for Ruanda-Urundi.

Up to date, gasoline—distributed in drums by companies established in the Congo—is almost exclusively imported by the eastern route, with the consequent disadvantage as to the unit cost of fuel.

Prospects of future improvement are based on the following projected achievements:

- the completion of new installations at Der es-Salaam, providing for direct unloading of sea-going tankers.
- the East African Railways' intention of commissioning the oil companies to construct two 750 T. tanks, providing for the stock-piling of 10,000 drums.

3. MAPPING AND SURVEYING

(a) Aerial Surveying.

The 1:100,000 scale map of Ruanda-Urundi drawn during the period from 1920 to 1925 no longer meets present requirements. For it is now becoming imperative to prepare maps for the arrangement of certain regions, to study new road lay-outs, to draw up geological maps and cadastral surveys.

To achieve these aims, the Ten-Year Plan considers the establishment of surveys from air photographs, with the co-operation of the Belgian Congo Geographic Institute, which will be in charge of the shooting and the preparation of the area, while specialized institutions in Belgium are to ascertain precision details and carry out the drawing.

Contemplated work for the next ten years has been drafted, for the Belgian Congo and Ruanda-Urundi, on the following basis:

- 1:100,000 scale maps: 185,000 square miles.
- precision work: 46,000 square miles, the order of priority for various types of work to be determined by the General Government.

For Ruanda-Urundi, the Ten-Year Plan considers the following needs as the most urgent:

| | |
|---|--------------|
| 1:2,000 scale: map of urban areas | 25 sq. m. |
| 1:20,000 scale: | |
| Lay-out of the Kigali-Nyanza road and Astrida-Shangugu connection | 130 sq. m. |
| Valorization of certain uninhabited regions..... | 1,200 sq. m. |
| Mining cadastral surveys | 3,000 sq. m. |

(b) Cadastral Surveys.

In addition to the new work which will be necessitated by the economic expansion of the Territory, the activities of the cadastral services in the course of the coming years will include the settlement of the important cadastral litigation which for various reasons has been accumulating since 1932. This will involve:

- the measurement of rural properties totalling 3,320 acres.
- the measurement of registered plots located in commercial centers.
- the drawing of district maps of urban areas.
- the drawing of district maps of the secondary administrative and commercial centers.

4. GEOLOGY AND HYDROGRAPHY

1. GEOLOGY

The Geological Service will have a three-fold function within the general scheme of the Ten-Year Plan:

(a) to effect the geological and hydrographic research required by the economic and social development of the Territory; from the geological standpoint, these research includes:

- the local sources of fertilizers (in particular: lavas and potassic pegmatite, phosphate minerals);
- the deposits of limestone and calcareous tufas;
- the possible locations of Pozzolanian tufas;
- the secondary minerals;
- prospection in the Kakeru National Park—(1).

(b) to assist other services whenever geological problems are raised

(1) See p. 70

by their work. This would be particularly the case for the Mining Service, the Public Works Service and the Agricultural Service.

(c) to carry out studies in pure geology, and in particular, to establish a general geological map of Ruanda-Urundi.

The Ten-Year Plan furnishes a detailed account of the increased means suggested to enable the Geological Service to fulfil its mission.

2. HYDROGRAPHY

As explained in the chapter of the Ten-Year Plan relative to the water supply (I), hydrographic action is particularly important in Ruanda-Urundi, on account of the high density of its population and the great difficulty of its supply in drinking water.

Work in this field is closely connected with geological research, which it is intended to guide, at the same time contributing valuable data to geological documentation.

Apart from these studies and research, the Geological Services will play an important part in the execution of the water supply program, by undertaking works involving soundings and underground pipings. Its activity in this domain will include 24 pipings destined to bring drinking water to urban centers and 1,062 pipings designed to improve conditions of water catchment in custom-ruled districts. The Ten-Year Plan gives a detailed account of the requisite means for the achievement of these various works.

5. METEOROLOGY

The Meteorological Service can bring valuable assistance to other public services and to a great number of private ventures. Such is the case for agriculture, mining prospection, aerial surveying, sanitation of the country by the elimination of germ-carrying insects, coverage of aerial navigation.

The Service is particularly useful in Ruanda-Urundi, as the forecasts it publishes will allow a better protective organization against famine through appropriate and timely measures.

Finally, meteorology will contribute to solve certain problems such as long-term forecasting of the regime of the Congo's tributary rivers and lakes, of prospective droughts in certain parts of the country, etc.

The ten-year program of the Meteorological Service, whose network in Ruanda-Urundi is closely connected with that of the Belgian Congo, covers the following realizations:

(I) See p. 17

- Definitive installation, in 1950, of the Astrida and Kigali synoptic stations; improvement of the Usumbura synoptic station.
- Precision barometric survey of 15 points of the Territory in 1952-53.
- In 1954-55, installation of 15 "secular" magnetic stations where fundamental geodesic and gravimetric measures will be taken; these stations will constitute the basic network for the preparation of the magnetic and gravimetric chart of the country.
- In 1950-1956, modernization and standardization of the 87 existing climatological stations and creation of about 60 new ones.
- With the collaboration of Inec and the future Belgian Congo Hydrological Institute, equipment for the detailed study of the schedule will be installed.

6. LONG DISTANCE COMMUNICATIONS

The long distance communications of Ruanda-Urundi form an extension of the Belgian Congo system, of which they constitute a section.

As early as 1934, the combined Belgian Congo and Ruanda-Urundi network was capable of ensuring radio coverage of aviation and of establishing radiotelegraphic communications; from 1936 onwards, this network was continually extended. Since the end of the second world war, telephone communications showed increasing activity: the Leopoldville-Brussels connection was extended to the principal European countries and to the United States; the Leopoldville-South Africa-Mozambique connection was inaugurated; the connection of the main interior centers of the Congo with Brussels via Leopoldville was progressively established.

Broadcasting has been organized since 1942 by the Long-distance Communications Service.

In brief, the program detailed in the Ten-Year Plan covers the following achievements:

Radio-telegraph stations:

- radio-telegraphic installations at Usumbura, in the two Residence capitals, in all territorial capitals and at the Kakitumba frontier post; at present, only Rutana, Ruyigi, Nyanza, Muramvya, Bubanza and Kibuye still remain to be equipped.
- installation of a telegraph connection by teletype, using carrier current, between Usumbura and Costermansville.

Radio guidance stations:

- for Usumbura: 1 plant for transmission in plain, 1 goniometer, 1 low-power radio beacon.
- for Kigali: 1 plant for transmission in plain, 1 300 watt radio beacon.

Telephone service:

In addition to the lines now working (Usumbura-Uvira-Kalundu lines and Kisenyi-Goma service line), it is proposed:

- to equip the Usumbura exchange with automatic sets
- to establish a radio-telephone connection between Usumbura and Albertville
- to install a telephone system at Astrida, Kitega and Kigali
- to prolong—by a carrier current equipment—the Otraco line connecting Usumbura with Kumanjola to Costermansville, with a view to setting up a telephone connection between Usumbura and Leopoldville and Belgium via Costermansville.

Broadcasting service:

This service, which is now being organized and installed in Ruanda-Urundi, will include:

- a technical service,
- a broadcasting station, with a studio, at Usumbura.
- public address stations in the principal native cities.

III.

THE DEVELOPMENT OF THE VEGETABLE AND ANIMAL PRODUCTION

INTRODUCTION

In Ruanda-Urundi, the agricultural expansion, as well as the development of stock farming, is dominated by the problem of overpopulation and pastoral overworking.

According to the results of the estimated census of land occupation, analyzed at length in the Ten-Year Plan, the situation at the end of 1949 was the following:

According to their natural destination, the soils could be divided into:

25.28% unsuitable for agriculture or stockraising, and
74.72% potentially productive, whereof

41.43% were naturally agricultural
29.30% were naturally pastoral
3.99% were naturally forest

On the average, there are 7.11 acres available for cultivation per family and 4.02 acres of pasture land per head of cattle. Now in a coun-

try like this one, from 5 to 12 acres of culture land are necessary for each family, and an average of 7.4 acres per head of cattle. Which means that in Ruanda-Urundi, out of a total of 780,000, 145,000 families are in excess, and that there is a surplus of 440,000 head of beef cattle of our a total of 970,000.

Considering the gravity of this state of things, one of the main objectives envisaged by the Ten-Year Plan is to offset this human overpopulation and overstocking, which are the causes of the gradual decrease of the soil's fertility.

In view of this aim, the program for agricultural development is based on the following notions:

- Natural conditions are accelerating the cycle of exhaustion of the soil; preservation of the soils and adaptation of native agriculture are imperative problems.
- Too densely populated regions prove incapable of sustaining their inhabitants on their own food production; the measures adopted to combat famine must therefore be reinforced.
- The diversity of the climate makes it possible to divide the country into regions of varied cultures: it is indispensable to create complementary zones and organize both specialized and mass productions.
- Valuable agricultural products, capable of being locally valorized by the incorporation of the highest possible portion of human labor, are the only ones which could be exported; cultivation of such products should return a sufficient purchasing power to agriculturists to enable them to buy larger and more varied quantities of foodstuffs than those they could reap on the lands devoted to exports.

A. VEGETABLE PRODUCTION

1. AGRICULTURE

The main lines of the Ten-Year Plan agricultural program can be summed up:

- to preserve the soil and subsequently increase its yield per acre.
- to create complementary zones, some being selected for intensified food production and others for export cultures or industrial valorization.
- to prepare the regions that could eventually receive new inhabitants, with a view to their re-population.

- to relieve the over-populated zones unsuitable for export cultures or industrialization, by causing the emigration of a part of their population to less populated regions.

* * *

In accordance with this general policy, the following results, of which an extensive exposition is given in the Ten-Year Plan, are expected in the course of the next ten years:

- Progressive intensification of the native cultivation of the arabic coffee-shrub, one of the few cultures which are well adapted to the conditions of medium and climate and at the same time offer profitable outlets for an important production.

Current production is about 7,800 Tons of marketable coffee and may rise to 15,000 T. in ten years' time.

The attempt to increase the coffee plantation area will take place concurrently with the implementation of such measures as the intensification of the fight against antestia, the dissemination of rational methods of trimming and a more judicious use of pesticides, as well as the creation of a series of new mechanical depulping plants in native communities. Target number of these plants is 170, and they shall be set up by the "Ruanda-Urundi Office of Native Coffees," which is also in charge of the verification of conditioning and of the classification of coffees.

- Extension of cotton farming, present production is 3,700 T. of seeds. Considering only the agricultural prospects of the Ruzizi plain, this production will easily be increased to 9,000 T. within the next ten years. Processing of this production—an oil-manufactory is soon to be established in the Territory—will furnish 4,500 T. of manufactured cotton, 450 T. of cotton-oil, 1,700 T. of cottonseed cakes and 225 T. of linters.

Furthermore, research will be undertaken in the Mosso—now one of the great depopulated regions of the country—to discover whether it might not also be suitable for cotton growing.

- Improvement and possibly extension of tobacco growing. Production, which amounts to some 400 T. for the native plantations, might easily be increased provided reliable outlets are found. For this purpose, an expert on strains and methods of culture and processing will be commissioned to study the matter.

- Extension of rice cultivation, whose production, on account of the valorization of the Ruzizi plain, will swell from 235 to some 2,750 T.; rice will also be re-introduced in the Mosso region.

- Extension of the oil-palm cultures. The plantations, localized exclusively in the low warm plains on the banks of the Tanganika lake and on the surrounding foot-hills, will be increased from 650,000 to 1 million plants.

- Production, which now represents 635 T. of oil and 250 T. of palm-nuts, almost entirely of native origin, will probably attain 1,800 T. of oil and 700 T. of nuts in ten years' time; it will reach respectively 3,000 and 1,000 T. when all the palm-groves will be in full yield. As the production increases, it will become more and more desirable to have oil-manufactories equipped with centrifugal separators and the requisite apparatus for the processing of palm-nuts.

- Extension and improvement of wheat cultivation. Production, owing to increased area and yield per acre, might pass from 15,000 to 34,000 or even 38,000 Tons. A flour-mill is available for treatment and stock-piling; the crude installations that exist in other places of the Territory will presumably also be improved later on.

- Extension of barley production, according to sales possibilities and in particular the prospective construction of European breweries in the eastern part of the Colony. Production will attain 5,000 T.

- Introduction of plantations of *quinquina ledgeriana* and *succirubra*. Considering the high cost of quinine, it appears advisable to persuade the native populations to grow their own plantations for their needs wherever this culture is possible. The native production of quinquina, which is only 20 T. of bark at present (production of European plantations is 83 T.), might in this way reach 700 T. in ten years' time.

- Increased production of fibers, according to the prospects of establishing local processing industries. Among the native products, the "sida and "triumfetta" species, as well as banana-tree fibers, seem to offer interesting possibilities of valorization. A rope-manufactory is already active. A sack factory will soon be installed.

- Introduction or expansion of oil-yielding cultures, wherever output is satisfactory. In particular: sunflower, peanut, soya and colza.

Production of soya will be tripled, passing from 1,000 to 3,000 T.; however, should favorable economic conditions prevail—from the point of view of prices and outlets—it could easily be multiplied by ten.

Production of groundnuts might be doubled, passing from 5,500 to 11,000 T., by means of large-scale publicity campaigns, followed up by the introduction of new seeds in the native farming centers. Two oil-manufactories will soon be capable of producing edible oil, whose processing residue can be made into groundnut cakes of high nutritive value.

The eventual expansion of sunflower cultivation will depend on the outlets offered by the local oil-manufactories. Colza farming will be introduced in so far as economic conditions favor this type of culture.

- Intensive development of agricultural food production in the regions that appear most suitable to ensure the regular supply of other regions.

This plan mainly concerns the production of corn which—by the use of selected seeds, might increase from 108,000 to 150,000 T.; of beans and peas which—mainly by the multiplication of more productive strains—could be respectively increased from 205,000 and 98,000 T. to 246,000

and 117,000 T.; of cassava which by increased culture areas could be carried from 958,000 to 1,258,000 T.; and of potatoes, which—by the introduction of hardy strains—could progress from 93,000 to 250,000 Tons.

— Creation of native agricultural centers in the Imbo district (a region to which the Ten-Year Plan devotes a detailed monograph); and in the Mosso; the regions of Buogoma and the Akangaru and Nyawarongo valleys will be prospected for this purpose.

— Progressive re-grouping of the populations, in particular in the Mumigwa and Kisaka districts; creation of demonstration villages in each region.

— Irrigation works in the Imbo, Mosso, Munira and Buishaza; study of irrigation possibilities wherever there appear to be any.

— Propaganda campaigns in favor of emigration to other regions of a part of the population of the regions where human overcrowding is particularly serious (Budaha, Bushiru, Rukiga, Umugongo, Bwanamukare, Mirenge, Buyenzi).

* * *

By the implementation of this Ten-Year program, out of a total of 5,542,680 acres of naturally agricultural land, in ten years' time the cultivated surfaces will pass from 3,257,930 acres to 3,590,400 acres, representing a 10% increase of the area under crops.

As for production volumes, those of native agricultural foodstuffs will increase by 31% and the native export cultures by 155%. The total value of these productions might thus increase from 3,667 million francs to 4,955 million francs. Of the resulting premium of 1,289 million francs, 1,075 million francs would be due to increased agricultural food production and 214 million francs to increased agricultural exports.

* * *

The implementation of the program advocated by the Ten-Year Plan will require not only the increase of the European personnel but also of native operatives. For this purpose, the agricultural training service will be completed as follows:

- The training of native agricultural assistants—their number is to be raised from 26 to 118—which is now being provided for by the Agricultural Section of the Astrida School Group, will be completed at the practical training school which Ineac proposes to set up at Rubona;
- The training of native instructors—their number will be raised



AN UNEARTHED GREEK THEATER? NO, A NURSERY. *At Rubengeri this collective nursery provides the native population with coffee plants and seeds.*

from 629 to 1,472—which was hitherto conducted by the agronomists under whose guidance they carry out their work, will henceforth be assumed by agricultural professional schools, of which 5 will be instituted in the course of the considered ten years.

2. SYLVICULTURE

In Ruanda-Urundi, the present forest is but a relic of the former structures. The clusters that remain have a total area of 600 square miles, scarcely 3% of the total area of the Territory.

The Ten-Year program considered by the Plan with regard to sylviculture, summarized in this section, is mainly concerned with the planting of woods, the production of firewood and the restoration of the forest mantle.

Timber Production of Forest-groves:

It does not even cover local consumption: most of the timber is imported from the Belgian Congo. This situation renders it imperative to preserve and enrich the remaining forest-groves.

The program of forest enrichment includes the adjunction of 5 new lumber-yards—stretching over 1,020 acres—to the present two. At the same time, the forest riches will be inventoried and assessed; certain areas will be reserved and the exploitation of existing groves will be rationalized.

Firewood Production:

This problem is vital in Ruanda-Urundi, above all because it concerns a vast native population.

Whatever the areas that may be re-timbered, they will not suffice to cover the constantly increasing needs if wood is not rationally exploited and used sparingly. That is why, as far as possible, it will be necessary to substitute hydro-electric power for firewood and replace baked bricks by other materials.

In order to cover the needs of the natives to the largest possible extent, the present policy—consisting of imposing on communities the re-timbering of 2.5 acres per 300 taxpayers and furthering the planting of trees in the vicinity of the homes—will be pursued. This method allows us to anticipate, in addition to the approximate 81,500 that had already been re-afforested in this way at the end of 1949, a further 50,000 acres of native re-timbered groves.

Moreover, new re-timberings will also be carried out in the administrative posts for their own needs, which will raise their total from 2,000 acres to 7,750 acres.

Restoration of the Forest Mantle:

Over 300,000 acres of present grazing land will have to be protected by a bush or shrub cover which will check an already excessive degradation.

Applicable techniques will be tested by Ineac, which will select the most suitable and economical protective timberings.

In the mean time, the Forest Service will immediately undertake a vast program of preservation, mainly by protecting carefully chosen groves. Within ten years, this action—destined to increase as quickly as possible the percentage of forest land in the country—might cover an area of 250,000 acres.

Furthermore, it will be necessary:

- to protect as soon as possible the chosen areas from bush fires;
- to perfect a method for the creation of anti-fire barriers
- to put certain residual forests in reserve, as well as regions of thick savannah which are not yet protected;
- to girdle the springheads and other places where landslides occur that may worsen erosion, and further the development of a vegetal cover.

B. ANIMAL PRODUCTION

1. NATIVE STOCK RAISING

Ruanda-Urundi is a country overburdened by cattle; there are only 4 acres per head of beef cattle, while according to the most moderate estimations, an average of 7.4 acres is required.

This greatly affects the economic value of the livestock, which is generally underfed and diseased, especially as the native, considering cattle exclusively as a token of wealth and social prestige, will use any means to prevent the killing of beasts of excessive age or of deficient constitution.

The result is that the number of animals slaughtered or sold for export remains substantially inferior to the normal livestock fructus, which rapidly aggravates overstocking. That is why the Ten-Year program outlined here is centered on the resorption of excess livestock.

* * *

Solving of the Overstocking Problem:

Before the possibilities of pasture in the various regions of the country are assessed by the study which will be undertaken by Ineac, the number of cattle to be maintained, considering the availabilities in pas-

ture land, has been determined on the basis of 7.4 acres per head, which reveals an excess of beef cattle amounting to 45.66% of the present livestock: the number of horned cattle should be reduced from 973,658 (the 1949 census figure) to 529,091, which implies the elimination of 444,567 head, or nearly 50,000 annually during 9 years. To this must be added the normal fructus of livestock, amounting to about 120,000 head each year, so that the total annual elimination should be of 170,000 cattle, while present deductions for slaughter and export only account for 100,000 head. The 70,000 surplus head can only be eliminated by increased slaughtering and sales for export.

The two principal means advocated by the Ten-Year Plan for the reduction of the livestock are the suppression of the traditional custom called "ubabaki"—a custom which solidifies the bonds gradually created in the course of centuries between the natives, on the juridical as well as on the political and social plane, with reference to the cow—and the organization of a rational economy based on the creation of a native stock raising cooperative.

Selection and Betterment of Livestock:

This program will be brought into practice both on the two governmental selection farms and in the native communities, where mass selection will include the re-institution of zoo-technical casting.

Improvement of Grazing Land:

Destined to improve livestock feeding, these provisions as explained by the Ten-Year Plan, will include the following achievements, staggered over ten years:

- draining of a total area of about 5,000 acres, mostly in the wide marshy valleys of the country;
- clearing of undergrowth, followed by rational valorization, of about 37,000 acres in regions of light savannah;
- irrigation of over 245,000 acres, in order to offset the effects of the protracted dry season.

Improvement of Stock Raising Conditions:

This program, destined to remedy progressively the deficiencies due to unsatisfactory customary methods of animal farming, will be implemented by the installations, in the natural agricultural regions, of combined arable and livestock farms and, in the natural pastoral regions, of livestock farms.

The success of this program will depend on the application of rational stock raising practices: methodical rotation of pastures, hay-tossing and ensilage, control of bush-fires.

Disease and Parasite Control:

The current research on livestock diseases carried out by the veterinary laboratory—a new one is to be established at Astrida—shall be intensified.

The fight against diseases will be promoted by the increase of rural veterinary dispensaries, which will number 60 instead of the present 28.

This also applies to the fight against diptera and disease propagators, particularly ticks. Their destruction will be facilitated by the installation of 80 dipping tanks in the various stock raising districts.

Organization of Livestock Economy:

The present demands on the cattle stock amount to about 100,000 animals, of which 80,000 are slaughtered and 20,000 are exported to the Belgian Congo.

A scheme aiming, as explained above, to raise these annual demands to 170,000 head of butcher's meat will call for an adequate commercial organization and equipment. The following measures are envisioned: multiplication and equipping of cattle markets, which will total 38, re-institution of regulations imposing maximum and minimum sales prices for cattle and control of their application by the veterinary service, multiplication of slaughter-houses and yards.

The problem of outlets for cattle meat is not relevant, for local consumption can absorb increasing quantities of meat of native origin. If increased exports of fresh meat became possible later on, the Belgian Congo would represent a considerable potential demand.

More or less important refrigerating plants could only be considered to the extent required by the disposal of meat on external markets (1).

Milk and By-products:

The present supply of milk from native stock raising farms is negligible, as the average yield of a milch cow does not exceed 1 to 1.5 liters a day, which corresponds to a total production of about 45 million liters, the major part of which goes to feed the natives and the calves.

Within ten years, average daily milk production could be raised to 3 liters per cow, which for 150,000 milch-cows, would correspond to an annual production of 135 million liters. Of this total, 40 million liters would probably be reserved for the feeding of the calves, 80 million for native consumption and 15 million for the manufacture of butter, cheese and other by-products.

Hides:

The preparation of hides in native communities shall be improved by increasing the number of drying-sheds. Current exports totalled 1,062 T. of cattle hides and 149 T. of goat skins in 1949.

(1) See pp. 50-52

* * *

The means suggested by the Ten-Year Plan for the implementation of the program outlined above include important increases in the European veterinary staff. The number of native assistants, trained at the veterinary section of the Astrida School Group, will also be augmented. Contemplated increase is from 44 to 122 agents, among which there will be 65 assistant veterinaries, 28 veterinary warders and 24 veterinary male nurses.

2. FISHING AND PISCICULTURE

Fishing and pisciculture must be developed for the benefit of the native, for they can supply him almost without effort and at a very low cost, with a complement of food which will reduce the deficit in animal proteins.

This is particularly true in Ruanda-Urundi, an overpopulated country where land and pastures are lacking, but where natural lakes and flats abound.

Let us now sum up the realizations envisaged by the Ten-Year Plan in this respect:

(a) *Fishing:*

LAKE TANGANIKA.

Development of fishing in this lake, with an area of 640 square miles within the territorial borders of Ruanda-Urundi, is based on the conclusions of the hydro-biological research mission which studied it in 1947 and whose report issued in July 1950 contained important precisions on "ngdala" fishing in the lake and on the best methods to exploit this possibility in a rational way.

According to this report, the lake's biological capital, even without considering the enormous reserves represented by the deep waters—about 4/5 of the total volume—is such that at least 30,000 Tons of "ngdala" can be fished each year without danger of exhausting the supply. Out of this quantity, Ruanda-Urundi's share would be about 7,500 T.

To promote, among the coastal populations, an increase in fishing capable of attaining this figure, action will be taken by successive phases to encourage existing fisheries, to improve the material conditions of fishing, and finally, to organize a complete system of exploitation.

LAKE KIVU.

Fishing in this lake, which is poor in fish and where hydro-biological study has not yet been undertaken, might be developed with the help of better fishing requisites.



SELLING THE BEAUTIFUL CATTLE. In a meadow near the public market of Kitega in Urundi. The farmer, nobly draped and leaning on his staff, awaits the customers.

THE INTERIOR LAKES.

They contained only catfish and various unsavory kinds of fish before the Administration introduced tilapia fry in some of them in 1936.

The stocking in fish of lake Mohasi was particularly successful, but limnological studies will have to be undertaken in order to determine the adequate measures to restore the balance of the biological cycle.

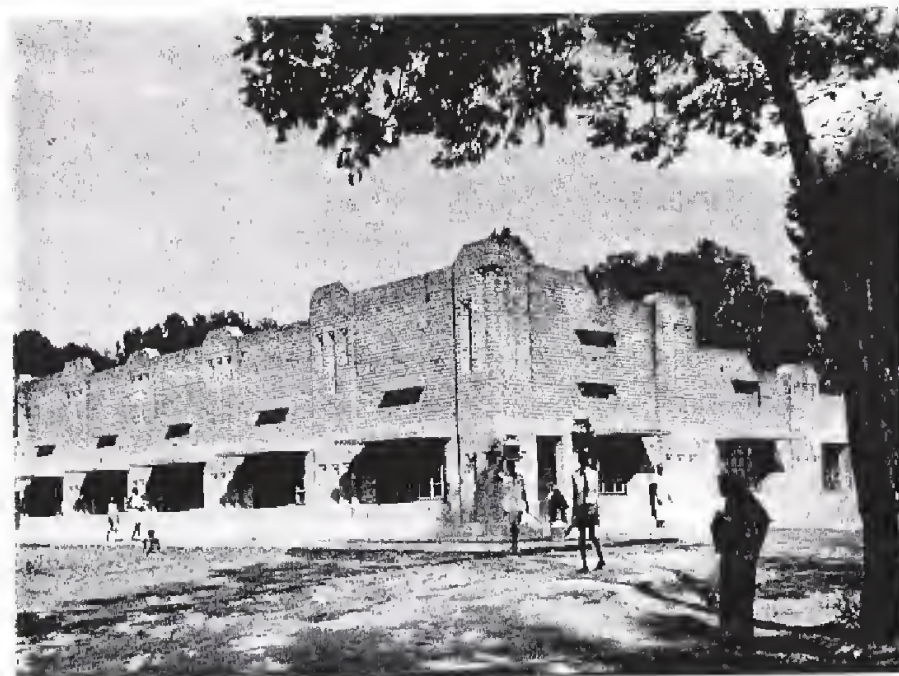
(b) *Pisciculture:*

Systematic extension of pisciculture in native surroundings will be intensified by various means, of which the school is the surest and most rapid.

Before entering the phase of extension proper, it will be necessary to set up principal fish breeding centers. One already exists in Urundi and another one is to be installed in Ruanda. Species selected by the Elisabethville Station for piscicultural research will be experimented with in these centers and adapted to local conditions, with a view to providing the subsidiary fish-breeding centers (6 are to be established) with the most appropriate species. The latter centers will in their turn supply alevins for the native fish hatcheries, which will be constructed under the supervision of the piscicultural agents and their assistants.

* * *

The accomplishment of the Ten-Year program outlined above will raise the total production of fish—about 2,000 T. in 1949—to 17,500 T. at the end of the next ten years. This quantity can be estimated at over 100 million francs and represents 2,100 T. of animal proteins.



A DAIRY COOPERATIVE AT NYANZA. 13 tons of butter are produced monthly by this native cooperative, organized in 1943.

IV.

MINING, INDUSTRIAL AND COMMERCIAL EXPANSION

1. THE DEVELOPMENT OF MINING

The mining industry in Ruanda-Urundi, though far less important than the Belgian Congo mines, nevertheless occupies an outstanding place in the Territory's economy: in 1949, with some 2,000 T. of exported minerals, it accounted for 30% of the total value of exports and intervened to the tune of 38 million francs in the public revenue, which means that it represented about 14% of the receipts budget of Ruanda-Urundi.

The evolution of production is recounted by the Ten-Year Plan since its inception: it reached a value of 166 million francs in 1949, cassiterite production (2,267 T.) accounting for about 130 million francs, over 80% of the total. The same year, wolfram production reached 200 T. and gold, 235 T.

In order to maintain and increase the present production level, it will be necessary to intensify research and prospecting and make cheap hydro-electric power available to the mining industry.

According to the Ten-Year Plan, it is particularly imperative to promote an important development of research, by reason of the exhaustion of alluvial deposits, which were naturally the first to be discovered and exploited, especially as in the course of the war years operators were called to intensify their production.

To this end, in addition to the program of studies and geological research assumed by the Government, the Ten-Year Plan envisions the organization of a prospecting mission by the Geological Service in Kagera National Park in 1950 and 1951, since the discovery of important mineral lodes would favorably influence the economy of a poor country which urgently requires the valorization of all its natural resources. The results obtained at the end of these two years will furnish indications on the interest of proceeding to a systematic prospection, which could then be entrusted to an organization instituted under the aegis of the State.

Moreover, all over the Territory, an important research program is being considered by the various mining ventures.

The main problems of exploitation analyzed by the Ten-Year Plan deal with labor, power and transportation.

Labor employed in the country's mining concerns totaled over 15,000 natives in 1949. The productivity of this man power is much lower than in the Belgian Congo, a fact which is due not merely to the sometimes primitive conditions of working and the technical difficulties encountered by certain concession holders, but mainly to the low physical

capacity of the workers, their instability and inadequate technical ability. The different achievements advocated by the Ten-Year Plan—in particular in the fields of nutrition, public health and education—are intended to remedy progressively these deficiencies.

On the other hand, the Ten-Year scheme for the improvement of the road system will create better economic conditions for the transportation of minerals and mining requisites, as well as of the workers' food supply.

Finally, the electrification of the country, through the utilization of the Ruzizi River's hydro-electric resources, will answer one of the essential requirements of mining: a plentiful supply of cheap current.

2. INDUSTRIAL AND COMMERCIAL EXPANSION

The expansion of industrial and commercial activity—on which the Ten-Year Plan furnishes important statistics—has been especially appreciable since the last war: from 1939 to 1949, the number of firms rose from 492 to 883; the increase of industrial ventures in the same period was particularly remarkable, their number passing from 75 to 298. At the end of 1949, capital invested by firms with their headquarters in the Territory amounted to about 787 million francs, and capital invested by firms with their headquarters in the Belgian Congo to about 175 million francs.

Exports from Ruanda-Urundi attained 72,217 T. in 1949, with a total value of 731 million francs, while imports reached 57,643 T., with a value of 806 million francs. If we compare the figures for external trade during the last ten years, we can observe that over this period exports increased 3 times in quantity and 8 times in value, while imports increased 4 times in quantity and 10 times in value.

Current exports only represent a small part of the Territory's total production, estimated at nearly 3 million Tons and consisting, for the greater part, of the food production consumed by the population. Coffee and cassiterite constitute the most important fraction of these exports: in terms of value, these two commodities represent respectively 32% and 17% of the total exports, i.e. 49% together.

As for the internal market, which is a function of the purchasing power, its present degree of importance can be measured by assessing the native net income (that is to say, excluding the value of the production directly consumed by native producers or traded among natives), which is analyzed in detail by the Ten-Year Plan. This income can be estimated, for 1949, at 683,708,000 francs.

The greater part of the resources in cash acquired by the natives serves to buy trading wares, also estimated by the Ten-Year Plan. These evaluations show that at the present time Ruanda-Urundi's internal market

is already capable of absorbing a potential consumption of approximately 600 million francs, of which 60% would be spent on clothing.

The expansion of outlets, both internal and external, is closely connected with the intensive valorization of local productions. This will be the work of private enterprise, which the State should instigate, stimulate and assist within the limits of its function.

Today already, a survey of the Territory's peculiar economic factors reveals the interest of three important industrial combines: installations for the processing of meat and its by-products, fertilizer works and sugar factories. We must also mention the industries which will normally be set up as a result of the development of industrial cultures (I). We may also anticipate the creation of a certain number of handicraft workshops which will cater to the internal market. Finally, we may expect the economic development initiated by the Ten-Year Plan to lead to an important expansion in the production of requisites and building materials (cement, various materials, carpentry, etc.).

* * *

The following paragraphs outline the measures to be implemented by the Public Authorities, as advocated by the Ten-Year Plan to stimulate the industrial and commercial expansion of the Territory:

- the creation of an "Office for the valorization of Ruanda-Urundi native agricultural and livestock production" whose role, fully explained in the Ten-Year Plan, will be to promote this valorization and develop internal and external outlets.
- the creation of native cooperatives, whose specific field in Ruanda-Urundi is rural economy. In particular, it is proposed to create cooperative associations of cattle breeders, as well as cotton and coffee producers cooperatives.
- the electrification of Ruanda-Urundi, by harnessing the hydro-electric resources of the Ruzizi River. According to the detailed exposition given in the Ten-Year Plan, the works—to be achieved in the first four years of the ten year period—will include two main power supply lines: one for the supply of Usumbura and the other for North Ruanda, delivering current to Astrida, Nyanza, Kabgaye and Kigali, and to the mining works situated in this part of the country.

(I) See pp. 57-62



MODERN MINING. Three machines do the work of 500 men in this tin mine in Rwinkwavu.

THE DEVELOPMENT OF SCIENTIFIC RESEARCH

1. THE PROGRAM OF THE INSTITUTE FOR SCIENTIFIC RESEARCH IN CENTRAL AFRICA (I.R.S.A.C.)

The "Institute for Scientific Research in Central Africa," established by the Decree of the Regent dated July 1, 1947, has at present three scientific research centers available for the study of the region to the East of lakes Tanganika and Kivu; at Astrida, Uvira and Iwiro; all three will be largely devoted to the study of the problems of Ruanda and Urundi. Furthermore, three permanent study stations, under the administrative control of the Astrida center, will be set up very soon, in the Mutara and Mosso districts and on the Congo-Nile ridge. This system of centers and stations will make it possible, thanks to a progressive increase of the managing staff of research-workers and technicians in the course of the next ten years, to carry out the program envisioned by the Ten-Year Plan, in close cooperation with the Government services and other public organizations. The main lines of this program are:

(a) *Study of Physical Conditions:*

- a complete geographical survey, including the synthetic study of African rift.
- specific studies in general geology, in particular the study of the stratigraphy of the Ruzizi and Urundi basins and the consequent intrusive magmas and mineralizations.
- demarcation of the natural geographical and geological regions.
- the meteorological and climatological study of the various regions of Ruanda-Urundi, by the creation of 3 main meteorological stations and 3 secondary stations, as well as of an observatory connected with the one at Uccle.
- hydrographic studies: exact delineation of hydrographic basins, assessment of the flow of the various rivers, assessment of the water schedule of the different natural regions.
- study of the natural vegetable cover.

(b) *Study of Natural Conditions:*

- study of the vegetable medium; in this respect, Irsac will fulfil a complementary task, in particular in the field of botanical studies: inventory of the flora, study of aquatic vegetation, study of higher mushrooms, study of the alterations of the soil

in terms of the content in mineral substances of nutritional vegetables, botanical and pharmacological study of native medicinal plants.

- study of the animal medium: study of animal associations and their geographical dispersion-area, as well as of their possible uses for human economy; creation of a few small flora and fauna reserves in sparsely populated regions. study of the distribution of germ carrying invertebrates, hydrobiological exploration of the lakes of eastern Ruanda and of the major rivers.
- study of the microbiological medium, already initiated at the Astrida microbiological laboratory, under whose supervision the production of yeast-proteins will be considered. In connection with microbiology, research will also be effected in the field of virology and human and veterinary tropical pathology.

(c) *Study of Human Conditions:*

- physical anthropology: somatologic study of the population.
- physiologic examinations, completing somatometric observations.
- study of nutrition, by means of dietetic surveys, whose synthesis will furnish practical indications on the improvements to be brought about in the diet of the populations.
- human paleontology: research on the prehistory of Ruanda-Urundi, which offers particular interest in this respect, by reason of its position at the junction of central and East Africa.
- social sciences: studies in social anthropology, as well as in the field of related sciences, such as history, prehistoric archaeology, human geography, psychology, demography, statistics.

2. THE PROGRAM OF THE NATIONAL INSTITUTE FOR AGRONOMIC STUDY IN THE BELGIAN CONGO

More than anywhere else, it is imperative in Ruanda-Urundi—where the danger of famine is permanent—to practice rational methods of cultivation, based on the doctrines and findings of a scientific research institution. This task has been entrusted to the "National Institute for Agronomic Study in the Belgian Congo" which has been commissioned to administer 3 agricultural research stations in Ruanda-Urundi: Kisozi, Rubona and Nyamyaga. Thanks to these stations, Ruanda-Urundi has been able to reap advantages from the work done at the Institute in the Belgian Congo, and will benefit by the future development of its activities, as envisioned by the Ten-Year Plan and summarized in this section.

(a) *Development of Agricultural Food Production Practices:*

- Selection and qualitative improvement of food production: control of results in local centers for seed selection and reproduction, multiplication of the best strains in native surroundings (the last two phases devolving on the Agricultural Service).
- Improvement and mechanization of agricultural food production; recognition of the rules of soil preservation and application of the best methods in native locations, creation at Rubona of a center for adapting in Ruanda-Urundi the various methods of agricultural mechanization that will be studied in the Congo.
- Preservation of food commodities: the methods studied in the Congo will also be disseminated by the Rubona adaptation center.
- Use of fertilizers: the adaptation of the formulae worked out in the Congo will be studied in Ruanda-Urundi stations, as well as the investigation of local possibilities of fertilizer production.
- Fight against diseases and depredators: a laboratory will be equipped at Rubona to control the application of the results obtained in the Congolese laboratories.

(b) *Development of Industrial Cultures:*

- Selection of strains and improvement of cultivation methods, by the organization of a scheme of local experiments to test selections in the various ecological environments and ensure the reproduction of the best acclimatized strains.
- Improvement and mechanization of agricultural work: the results of the contemplated research on food crops will generally be applicable to industrial cultures. Mechanization will be studied for the processing or drying of certain products.
- Use of mineral fertilizers: the basic research will be effected in the Congo; the adaptation of fertilizer formulae to the exigencies of each ecological medium will be pursued by means of local tests.
- Fight against diseases and depredators: the means of control elaborated in the Congolese laboratories will be applied to Ruanda-Urundi.

(c) *Social Development:*

- Native farming: establishment of pilot-villages in the vicinity of Ineac stations, in order to progressively offset the consequences of the dispersion of populations and fertile soils.
- Improvement of rural habitat. In particular, research will be



A SYMBOLIC SCENE. An agricultural expert at work at the Kisozi station of the Ineac (National Institute for Agronomic Study in the Belgian Congo.) Improving the qualities of the crops, introducing better agricultural methods and preserving the soil are the main pursuits of the organization.

undertaken on building materials, stalling practices, etc.

- Creation of an agricultural practical training school at Astrida, where agricultural and veterinary assistants will go through their period of probation after leaving the Astrida school.
- (d) *Improvement of Stock Raising and Study of Zootechnic Problems:*
 - Improvement of grazing land and cattle feeding: assessment of the feeding capacity of natural circuits, study of the methods of preparation, treatment, protection and improvement of these circuits, creation of artificial pastures.
 - Selection of native cattle breeds.
 - Trial acclimatization of various types of cattle, in particular of African or imported country races, or of European ameliorated races, and crossbreeding with the local race.
 - Research on milk products and by-products: creation at Rubona of a laboratory, in particular to study milk-collecting practices as well as methods of processing and conditions of by-products manufacture.
- (e) *Recognition of Agricultural Terrains and Demarcation of Natural Agricultural Districts:*
 - prospection of soils by a pedo-botanical mission which will determine inter-relations between the soils and their natural vegetation,
 - study of pedological characters: a laboratory for pedological analyses will be equipped for this purpose at Rubona,
 - development of the eco-climatologic network,
 - organization of experiments in agricultural planning and valorization of sparsely populated regions (Bugesera, Murara, Mosso).
- (f) *Forest Problems:*
 - Their study will involve the creation by Ineac of a forest research station, which will include, apart from the arboretum at Astrida, a 590 acre area on Mount Huye and a section of the forest on the Congo-Nile ridge (to be specified).

VI.

THE MEANS.

1. BUILDING REQUISITES

The value of the constructions detailed in the Ten-Year Plan, both for Government services and State-controlled organizations, totals 24,228,640 dollars.

The average labor required for these constructions can be put at 4,340 full work-days per year.

The necessary materials can be estimated at a total of 182 million bricks and 310,470 cubic yards of quarry stones.

2. REQUIREMENTS IN PERSONNEL

According to the detailed summary drafted in the Ten-Year Plan, in order to ensure its integral fulfilment, the European managing staff will have to be raised to 913 agents, while the staff considered in the 1950 budget totalled 438 agents.

As for the native staff, which the 1950 budget fixed at 4,890 agents, according to the provisions of the Ten-Year Plan, it will have to be raised to 8,227 agents within ten years, without including hired day-labor, which will have to attain a yearly average of 10,000 full work-days per year.

3. FINANCIAL DEMANDS

The total expenditures which will be incurred both for the implementation of the various schemes envisioned by the Ten-Year Plan and by reason of the direct and indirect incidence of the Plan on Government or Government-controlled services, are summed up in the annexed tables, reproduced from the Ten-Year Plan.

They show that investment expenditures will total 73,405,600 dollars, of which 55,405,600 dollars will be exclusively incumbent on the public budget, the rest proceeding from the anticipated intervention of various state-controlled organizations which will contribute to implement the Plan, and from previously obtained credits.

Amortization over 25 years, supposing that Belgium is to bear the burden of the interests, would correspond to an annual amortization amounting to 66.5 million francs in 1959, the first year of amortization.

If we make allowance for this onus, and for the fulfilment of the Ten-Year Plan, the expenditure budget of Ruanda-Urundi would reach the figure of 642 million francs in 1959, while on the other hand, according to the very prudent estimates computed in the Ten-Year Plan, budgetary receipts might at that time approximate 700 million francs.

TABLE OF INVESTMENT EXPENDITURES

| | (thousands of francs) |
|---|-----------------------|
| I. Investments of the Ten-Year Plan (1950-1959) | |
| Hygiene | 497,656 |
| Hygiene | 497,656 |
| Education | 210,848 |
| Social and cultural action | 67,760 |
| Transport by road..... | 1,025,070 |
| Water-borne transport | 61,800 |
| Air routes | 161,523 |
| Town-planning | 1,500 |
| Storage and preservation of products | 20,000 |
| Mapping and surveying | 61,400 |
| Meteorology—Long-distance communications | 34,623 |
| Geology | 840 |
| Hydrography | 147,045 |
| Agriculture | 141,872 |
| Sylviculture | 2,600 |
| Stock Raising | 106,506 |
| Fishing and pisciculture | 19,200 |
| Mining development | 9,700 |
| Water supply | 428,645 |
| Industrial and commercial expansion | |
| — Valorization Bureau | 4,800 |
| — Electrification of Ruanda-Urundi | 300,000 |
| INEAC | 92,550 |
| IRSAC | 26,250 |
| Sub-total I..... | 3,422,188 |
| II. Investments outside the Ten-Year Plan | |
| Sub-total II..... | 248,092 |
| General total (I, II)..... | 3,670,280 |
| or....\$73,405,600 | |

TABLE OF RECURRENT EXPENSES

| | (thousands of francs) |
|--|-----------------------|
| I. Services of the Ten-Year Plan (1950-1959) | |
| Hygiene | 452,228 |
| Education | 217,284 |
| Social and cultural action | 80,897 |
| Air routes | 48,155 |
| Town-planning | 12,000 |
| Meteorology—Long-distance Communications | 59,170 |
| Geology | 11,380 |
| Agriculture | 217,998 |
| Sylviculture | 38,390 |
| Stock Raising | 102,220 |
| Fishing and pisciculture | 42,775 |
| Industrial and commercial expansion | |
| — Valorization Bureau | 48,000 |
| INEAC | 179,150 |
| IRSAC | 139,328 |
| Sub-total I..... | 1,648,975 |
| II. Services outside the Ten-Year Plan | |
| Sub-total II..... | 57,170 |
| General total (I, II).... | 1,706,145 |
| or....\$34,122,900 | |

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